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The Chemical Age

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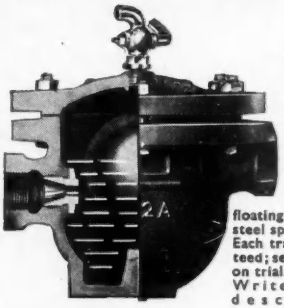

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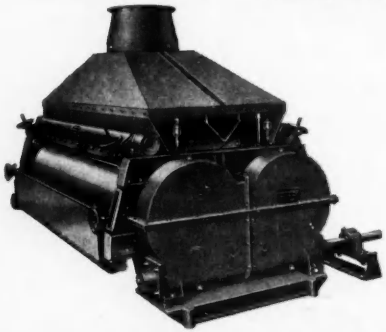

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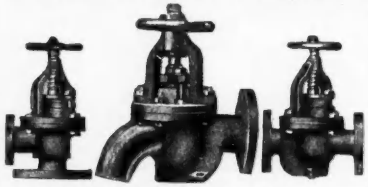

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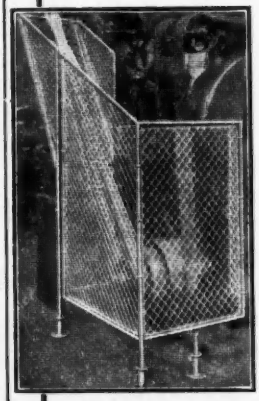

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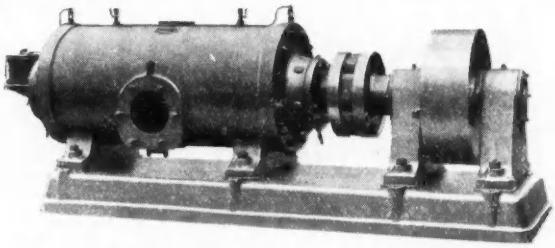

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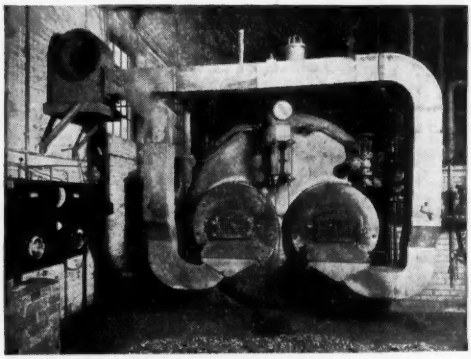

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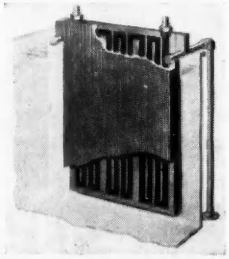

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Tees Offset. 45°		561	545	—
Tees reducing 4" grooved to 3" screwed		—	242	—
,, ,, 4" ,, ,, 2" ,,		—	360	—
,, ,, 4" ,, ,, 2" flanged		—	174	—
,, ,, 6" ,, ,, 2" ,,		—	—	187
,, ,, 6" to 4"		—	—	720
Bends 90°		654	725	—
Bends Adjustable		1,572	3,582	742
Bends 135°		980	1,500	968
Bends 157½°		1,142	763	771
Reducers long 2"grooved/1" screwed		807	—	—
,, short ,, ,, ,, ,,		654	—	—
,, 4" grooved to 2" screwed		—	1,140	—
,, 4" ,, ,, 3" ,,		—	740	—
Reducers 6" to 4" long		—	—	1,008
,, ,, ,, ,, short		—	—	332
Ends, Blank		802	1,480	360
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Adaptors, screwed M to grooved		2,071	335	678
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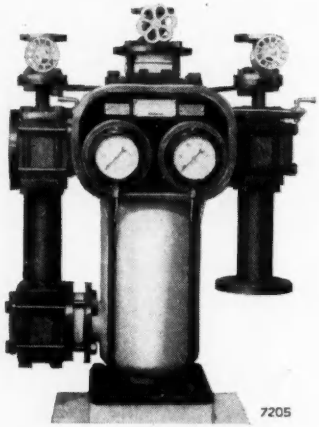

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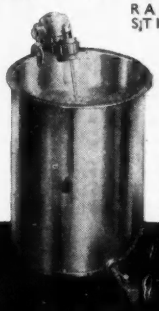

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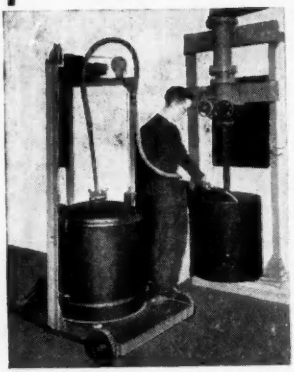

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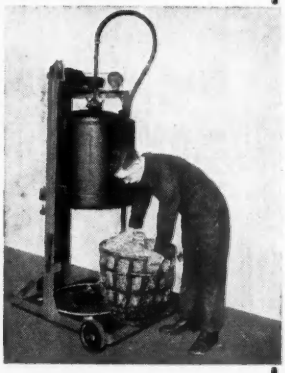

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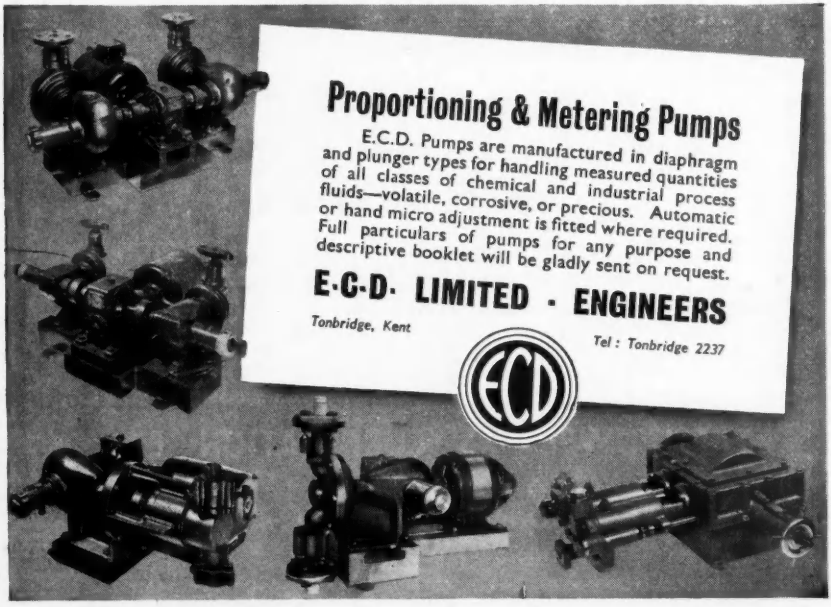
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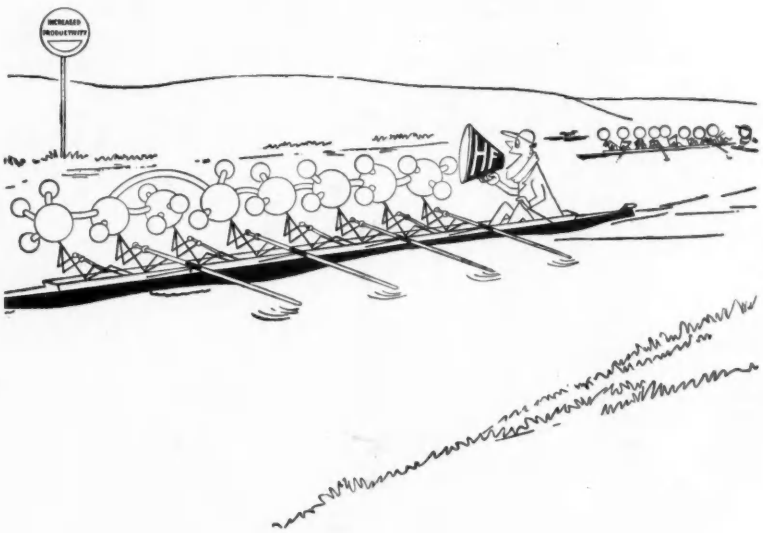

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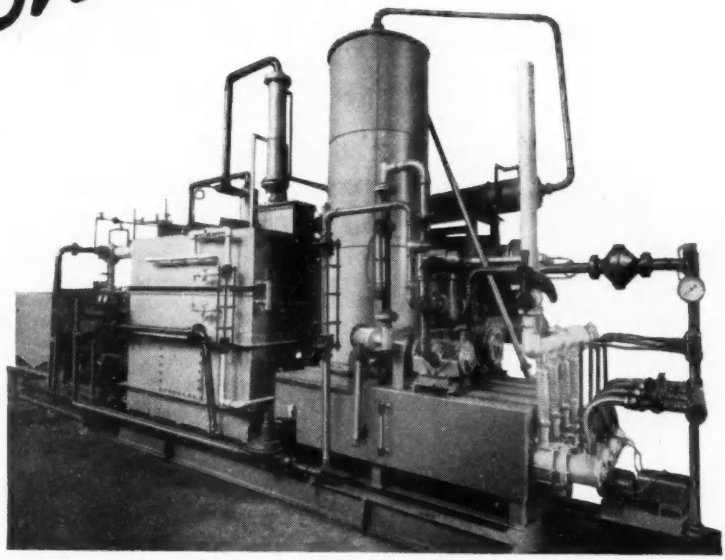

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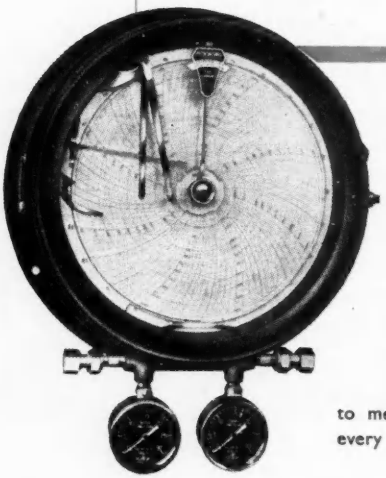

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Operational Research

IS it new? In what way is it new? Is it scientific? These are the three questions which, according to Professor P. M. S. Blackett, F.R.S., require to be asked when the subject of discussion is operational research. Many with a fairly wide acquaintance with research programmes of one sort or another might excusably preface those questions with another: What is operational research? The facts that during the constructive period of the war—constructive from the Allied viewpoint—the production of munitions of all sorts and the conduct of many kinds of warlike activity were the subject of detailed scientific and statistical study by experts not themselves engaged in the particular operations, and that this work often produced almost startlingly effective modifications, have not yet established operational research on an accepted conventional footing. Operational research is in most industries still a novelty, often an untried one, and the present urgent need to improve production efficiency and effect economies has provided the stimulus for an outstanding example of exposition which goes far towards answering the question. The sponsors were representatives of Manchester University and the Manchester Chamber of Commerce who combine to form the enterprising Manchester Joint Research Council. The council had many authoritative helpers in the five lectures and subsequent discussions at which operational research was studied in the round and in detail, and the new publication* in which all these facts and opinions are stated may form a reference work of permanent value.

Professor Blackett, whose penetrating summary of what operational research is and what it can achieve prefaces the studies by five experts from different branches of industry and the equally revealing discussions, has supplied the most economical definition. "Operational research is the scientific method of providing executives with the numerical basis for decisions." That necessarily does not convey all the many potential recommendations for making almost any large-scale industry the subject of statistical review by specialists. That work is done on the factory floor, as well as in the ledgers, and the viewers are exempt from the many distractions which beset those who operate the process in its wealth of detail. On those terms this form of research was shown—by much of the evidence adduced by the Manchester forum—"to have produced the same dynamic

* "Operational Research: Its Application to Peacetime Industry," published by the Manchester Joint Research Council; 10s. 6d.

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effects, in a relative sense, in the smaller spheres involved as the great scientific discoveries have had for the world at large." Those are the words of the chairman of the Manchester council, Sir Raymond Streat, C.B.E., who is one of the last people to be suspected of overstating the case for operational research or any other prospect.

The starting points of the Manchester discussions were full-length studies of methods and results of bringing scientific and statistical standards to bear on the day-to-day operations of five large industries—boots and shoes, the National Coal Board, cotton, steel and road transport. All were shown to have derived important improvements of efficiency and economy from what one of the exponents (Dr. W. H. Glanville, director of road research) described as "taking the scientist out of his laboratory . . . and letting him see and advise on the wide practice of running the business." That does not imply, for example, the metamorphosis of chemists into statisticians, but it does demand the intensive objective study and measurement of ordinary activities in accordance with the disciplined principles of the scientist. The doctrine as a whole contains some very obvious pitfalls for those who mistake it as a panacea for production problems at large, without placing operational research in its true proportions. It will not by itself eliminate any workshop problem, and fanatical reliance on this or almost any other statistician's touchstone can obviously produce ludicrous results. At least once the view was seriously advanced that the probable frequency of plant replacement could be determined in advance by some statistical relationships to the number of meals served in the works canteen. That route to Birmingham "by way of Brighton pier" was an American suggestion and clearly has nothing in common with what has been tentatively but encouragingly outlined at Manchester.

The standing of this subject has indirectly been greatly heightened from the plain man's viewpoint by the occasionally striking results gained from the dispassionate observation of ordinary things by the "productivity teams" in the U.S.A. Their aims did not differ substantially from those of operational research.

Notes and Comments

Soap and Synthetics

THE end of soap rationing in September could bring a fundamental change in the conditions of two very large sections of chemical process industry, the making of domestic soap, and of the synthetic detergents whose prominence in the household sphere has been attained largely since the war. Rationing of conventional types of soap has endured only since 1942 and the progress of the synthetic replacements, mostly based upon alcohols, has been little short of phenomenal. Most of it has been more recent than the beginning of rationing, and the rapidity with which the detergents have been adopted for household use has not all been due to the powerful advertising campaigns with which they have been introduced.

Marked Advance

IN their uniformly effective "softening" of water of varying hardness, their capacity for domestic jobs verging upon the industrial kind—such as paint cleaning—and their disposal of greasy precipitates, the soapless powders have represented a marked advance. Opportunities in the development of natural soap, except of special and toilet grades, may well be correspondingly limited, unless some large manufacturers elect to revert to their first-born, to the detriment of detergent research. An illuminating comment is that the detergent manufacturers in the United States—where there has been no soap rationing, and hence less need for soapless substitutes—claim that, of all materials sold for industrial and household cleaning, nearly half are synthetics. There would seem to be little reason to expect that the position in Great Britain will undergo radical change when soap is freed. If some heightened competition from the natural product acts as a spur to research for further improvement of the synthetics the new industry will become more firmly entrenched than ever.

B

Production Stimulus

OFFICIAL attempts at inculcating "productivity mindedness" have a habit of being as unconvincing as the jargon and slogans with which they are decked. "Productivity in Chemicals" is something so new and so different that it is surprising to note that it bears the stamp of the Government's Economic Information Unit, whose record in this kind of propaganda has not been distinguished. This booklet is a well produced and well illustrated presentation of the facts about United Kingdom chemical industry and about what must follow if output cannot be raised or if costs rise substantially. Most of those facts will not be news to managements, or to those who have read what the chairmen of chemical companies have had to say. Whether these data concerning the bearing of chemical supplies upon employment and general welfare are new or familiar to chemical workers, they have never previously been presented so well in that quarter. The secret of this realism, which is even more marked in the companion booklet, "Speakers' Notes", principally for trades union officials, seems to be that both are the fruit of collaboration between the Government information group and the Chemical and Allied Industries Joint Industrial Council and the Drug and Fine Chemical Joint Conference. The booklets together give a well drawn picture of the place of chemicals in the general scheme and they are the first in which a JIC has taken a hand.

Industrial Nurses

THE active discouragement of recruiting trained nurses into industry was an unwelcome suggestion in a report by a joint sub-committee of medical specialists in Scotland. Responsible for investigating the effect of the National Health Service upon the tuberculosis service in Scotland, the medical people suggest that, because the needs of the tuberculosis

service is so pressing, first-aid workers should be used to a greater extent in industry as a temporary measure, notwithstanding the existence of a legitimate need of nurses in this field. The retrograde character of that suggestion illustrates how critical is the shortage of trained nurses, leading to a situation in which help for one section of the medical services can be had only to the detriment of another. The deserving nature of the objective in this instance—to provide proper treatment, now often lacking, in the early stages of tuberculosis—is the only good excuse that can be advanced for robbing Peter to pay Paul. Good as they are, the first-aid men of most large works are not the equivalent of the hospital trained worker, whose withdrawal would certainly reduce the high standard gradually being attained by industrial health services.

Boiler Feed Water

DURING the past 20 years increasing attention has been given to the chemical treatment of water for boiler feed, and although there is still ample room for closer application of science to this hitherto rather neglected subject, the position has been reached where the menace of scale, corrosion and caustic embrittlement is now recognised as real and actual, and a little light is being shed on the more obscure aspects of this branch of water chemistry. It is important in these days, when all the emphasis is on production, that industrial plant should run with as few hindrances as possible. Full production, however, depends as intimately upon power as it does on continuity of processing, and the conditions under which the power is generated are of corresponding importance. Boiler explosions, of which a tragic instance was the subject of a rather inconclusive inquiry at York last week are, fortunately, rarities. Because the explosion cost a man his life there was no disposition to treat the matter casually. Whether there is any better reason for passing over the milder manifestations of inefficiency of industrial heat raisers is at least doubtful. Simplified methods of water treatment by physical or chemical means have greatly simplified the task of keeping steam and water equipment at least 80 per cent efficient. Yet all the technical aids, advisory service and propaganda have not yet disposed of the phenomenon of the heavily scaled or corroded industrial boiler, working well below the 80 per cent level and liable at any moment to turn saboteur. Its total failure can produce "sympathetic strikes" by other plant when the load on them is raised.

Improved Metal Study

RECENT work of the U.S. National Bureau of Standards chemists derives chemical engineering interest from the fact that a new technique has been developed for the study of plastic deformation in Monel metal. The X-ray diffraction methods formerly used were not particularly successful where minute areas were concerned. The new method is to use polarised light to make visible the differences in orientation that result from the deformation of a fully annealed specimen. Preliminary work suggests that this is more sensitive than X-ray diffraction, and it appears that polarised light might be used to detect preferred orientation resulting from shaping processes, such as rolling and stamping. Since other cubic metals, including copper, aluminium, nickel and *alpha* iron, can be made optically active this new application of polarised light should assist the study of a number of commercial metals.

U.S. Cites British Engineering Firms

FOURTEEN firms have been cited in a civil anti-trust suit filed by the Department of Justice at Pittsburgh as having been associated in an alleged attempt to control the world market in rolling mill equipment. Three British, one Canadian and one Australian firm are included in the list. They are: Davy and United Engineering Co., Ltd., Sheffield; English Steel Corporation, Ltd., Vickers Works, Sheffield; The Darlington Forge, Ltd., Darlington; Dominion Engineering Works, Ltd., Montreal; Broken Hill Proprietary Co., Ltd., Melbourne.

SAFETY IN CHEMICAL INDUSTRIES

Need for International Collaboration

THE need of international collaboration on measures to minimise hazards in the chemical industry was recognised by the inclusion of the subjects of safety and hygiene in the agenda for the second session, at Geneva, of the Chemical Industries Committee of the International Labour Organisation. It was decided to set up a sub-committee on the subjects.

A report prepared by the International Labour Office, now gives a model code for safety regulations in chemical industries and problems of hygiene.

The sub-committee was composed of 30 members, giving equal representation of Government, employers' and workers' interests. Mr. Duguid (Government member, United Kingdom) was elected chairman, with M. Nicaise (employers' member, Belgium), and Mr. Kumar Sen (workers' member, India) as vice-chairmen. The representative of the secretary-general was M. Vaage.

In the course of the long discusssions, Mrs. Beyer (U.S. Government member) explained the reasons for her Government's opposition to the proposed code and suggested that the ILO should collect and distribute information on the technique of accident prevention in different countries; study the question of collaboration between employers and workers; and distribute information on practical means of accident prevention. Other methods of accident prevention were the labelling of harmful materials, education of workers and proper training of factory inspectors.

Marking Dangerous Substances

M. Lafarge (Government member, France) thought the proposed code was unnecessary in view of the recent publication of the General Code. He thought the marking of dangerous substances was very important to protect workers in the chemical industry as well as the users of the products. It would be best for this sub-committee to confine its attention to a few outstanding risks such as those arising from benzene, silica and other forms of dust.

Mr. Hewitson (workers' member, United Kingdom) said that the workers could not agree that a general code was sufficient. Special provision must be made for the chemical industry. He knew it would take a long time to compile. There were some employers who did everything possible for safety and health but there were others who should be compelled to take similar action. It was important to avoid vague texts which led to misunderstandings in interpretation.

He appealed particularly to the representatives of the United Kingdom and the United States to see that the benefits which so many of their workers enjoyed in matters of safety and health were made available to the thousands of workers throughout the world.

ABCM's Rules

Referring to the good conditions in many factories, Mr. Baggs (Employers' member, United Kingdom) said that the Association of British Chemical Manufacturers had produced rules of a kind which the Workers' Group desired. These rules were, however, in general terms and when an attempt had been made to add detailed provisions to these rules the task was found to be superhuman. The difficulties encountered by the ILO in preparing drafts for this meeting were well understood. The existing code covered many of the risks of the chemical industry. It would, however, not be difficult to agree and to record the broad general principles of safety and hygiene.

It was finally decided that a further study should be made of means of accident prevention and health protection in the chemical industries. The ILO was therefore asked to make any amendments and improvements to the model code it might consider necessary and submit them to the third session of the Chemical Industries Committee.

Regarding classification and labelling, the ILO was invited:—

(a) to study the possibility of drawing up a classification of chemical products which should be considered as: dangerous and obnoxious; and toxic;

(b) to draw up the indications which should be reproduced on the labels attached to containers to warn users of the dangerous or toxic characteristics;

(c) to study the possibility of establishing an international mark of protection, to be affixed to the containers of all dangerous, obnoxious and toxic substances, such international mark of protection to be the subject of an international labour convention.

Questions concerning the organisation of

working hours in the chemical industries also came under critical review based on consideration of the ILO report. While some proposals submitted by the workers' group were not accepted, the following items were adopted:

Since conditions in the chemical industry with respect to unhealthy and dirty work vary, in calculating normal hours of work arrangements for changing clothes and washing must be the subject matters for normal negotiating procedure of individual negotiations in each member state.

In semi-continuous or continuous processes where there are three continuous shifts or where work is otherwise continuous, there should be a short break, without loss of paid time, to enable each worker to take a meal. It was also recognised as desirable that the average weekly hours worked by shift workers should be as nearly equal as practicable with those worked by day workers.

Organisation of shift working should be arranged as far as possible in consultation with the workers concerned, and shifts should be periodically rotated. Wherever practicable, each worker should be enabled periodically to take his rest period at night; to have at least one weekly period of rest of 24 consecutive hours, and to have his weekly rest period as frequently as practicable on the normal day of rest.

Where the work is dangerous or unhealthy the organisation of working hours, including time required for putting on and taking off special protective equipment in those occupations, should be directly related to the risk or hazard and should be the concern of both employers and workers. Such matters should be covered either by national legislation or through normal negotiating procedure.

Systems of fixing normal hours of work and overtime were considered, and it was suggested that overtime should be paid after the completion of such normal number of hours of work per day or per week as might be determined through the regular negotiating procedure in the respective member states. It was also recognised that the working of systematic overtime was undesirable.

The ILO was invited to undertake a comparative study of day work and shift work in the chemical industries.

The importance of a carefully and systematically trained labour force for the development of the chemical industry was considered. The ILO was requested to continue its inquiry into the necessity for improving and extending systems of vocational training and to submit its findings to the third session of the Chemical Industries Committee.

Jury Criticises Inadequate Firefighting Equipment

CRITICISM of an Ironbridge (Shropshire) metal works at which two people were killed by an explosion on May 12, was made in riders which the jury added to their verdict of "Accidental death" at the inquest on July 5. They said the premises were unsuitable for the work carried on, and that adequate firefighting appliances had not been available.

The inquest was on the managing director of the factory, Mr. Ferdinand Frankel, aged 57, of Wellington, a naturalised Bavarian, and an employee, Mrs. Kate Healey.

Evidence was given by some of the eleven injured firemen and employees that when a small fire broke out near the furnace it was smothered with foam but broke out again after a minor explosion. Divisional Fire Officer Sidney Herbert Powe, who was badly injured, said when he arrived he found water and foam being used. He stopped this because it was dangerous, and while they were waiting for sand to be fetched the main explosion occurred.

Mr. W. H. M. Drake (chief officer Shropshire fire service) said he had been worried about six previous fires at the two premises owned by Frankel. A few hours before the explosion he telephoned the factory inspector because he had been told by one of his officers who attended a fire at the works the night before that conditions were "appallingly bad."

Mr. William Lewis (chemist at the West Midland Forensic Science Laboratory) said the only method to deal with the fire was to cover it with sand and hope for the best.

Dr. Donald Mathieson (inspector of factories, chemical branch) said he thought there was a primary explosion of hydrogen, followed by a secondary explosion of aluminium powder and charred or uncharred paper. Mr. J. V. Lander (coroner), summing-up, said there was no evidence of criminal negligence.

Jubilee Bonus

Workers in the 80 firms controlled by the Bleachers' Association, Ltd., the £4 million Manchester textile combine, are to share a £25,000 jubilee bonus to celebrate the 50th anniversary of its founding.

THE GROWING FIELD FOR METALS

Exhibition Illustrates Many Essential Roles

THE importance of the application of metals and their many alloys in science, industry and the domestic field is emphasised in an exhibition "Metals in the Service of Mankind" which was opened by Princess Margaret at the Science Museum, South Kensington, last week.

The exhibition, organised by the Institute of Metallurgists in conjunction with the Science Museum and the major metallurgical research and development associations, reveals historically and technically the story of metals and their alloys.

Modern practice in the extraction and refining of the common metals is amply illustrated, and some of the varied applications of such metals as iron and steel, aluminium, copper, tin, nickel, lead, magnesium, cobalt and cadmium are shown by samples, models and finished products.

The importance of metals in chemical engineering is exemplified in the copper section by a model of a rectifying still.

In the tin section are demonstrated two unusual applications of tin. One is the use of tin oxide (SnO_2) in porcelain enamel for opacifying and the other shows hanks of silk, of which the "handle" and "scrunch" have been improved by immersion in solutions of tin (stannic chloride) and then hydrolised, leaving a tin oxide film on the fibres.

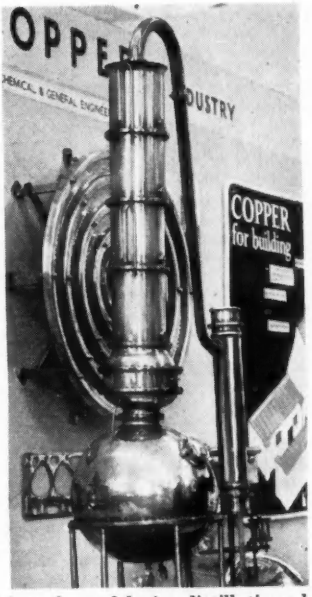
The Nickel Story

The wide range of uses of nickel in synthetic fertilisers, sterilised and processed foods, precision instruments and detergents is shown in diagrams and pictures. The main developments over two centuries, from its separation by the Swedish chemist Cronstedt in 1751 to production of the nickel-chromium alloys with high-temperature properties, are distinguished and tabulated. The refining of nickel by the carbonyl process is explained by models.

Powder metallurgy, the special technique which is proving of increasing importance in metal fabrication, is represented by samples of porous bronze used for filters for liquids and gases, mixers and diaphragms.

Welding processes and research illustrate the part played by this technique in pressure vessels, pipe lines and in the chemical industries.

One of the most interesting sections is devoted to the 12 rarer metals and provides a glimpse into the future of metal technology. The illustration of the electrical properties of gallium represents a new field of research from which important results are expected.



This scale model of a distillation plant illustrates one aspect of the wide adaptability of copper

Testing of metals before they are put into service, which may be very exacting, is represented by one entire section, devoted to some of the usual tests for finding strength, hardness, and resistance to shock and creep.

The metallurgical laboratory section shows the techniques adopted to ascertain the composition and properties of metals. It reviews reduction, purity, refractories, control, melting, working, microscopy, X-ray diffraction, composition heat-treatment, failures and chemical analysis.

The handbook and catalogue contains 11 chapters, presenting the story of metals in non-technical language for those who have no serious acquaintance with metallurgy. The exhibition will remain open until the end of September.

INFLATED METAL COSTS

Federation President on Effects of Bulk Purchase

DIFFICULTIES which beset the non-ferrous metal industries, particularly those associated with bulk purchasing by the Government, and the increased cost of metals, were discussed by Mr. William H. Henman, in his annual report, following his re-election as president of the British Non-Ferrous Metals Federation on July 6.

Mr. Henman expressed his thanks to the annual general meeting and said that he deeply appreciated the honour which had been accorded him by the industry.

"I have this year completed 50 years' active work in the industry," said Mr. Henman, "and as I look back to the beginning of my industrial career and compare the conditions of those days with the conditions of the present, like many of the older among us, I notice some very remarkable changes."

Gains and Losses

"There have been enormous advances on the material side. There has, of course, been one major change in the structure of the industry which is not peculiar to our industry, and which has profoundly altered the whole industrial life of the country. Today, the owners have, very largely, been replaced by the management. I think something has been gained, but I am quite sure that a great deal has also been lost by this change, which, however, has become quite inevitable as a result of the much larger scale and heavier financial burden of modern industry.

"There is one outstanding change of a practical kind. I refer to the cost of the metals in which we work. When I was a young man copper cost about £50-£60 a ton, and zinc about £20-£25.

"Most of us remember the days in the early 'thirties when copper went down to £25 a ton and zinc to £9. It was still possible then to regard the non-ferrous metals as base metals. To-day they have almost entered into the realm of semi-precious metals. The price of copper is £186 a ton and the price of zinc is £127 10s. Copper is only a few pounds below the record price which it reached during the Continental blockade during the Napoleonic Wars, when manufacturers were forced to melt down the copper coinage of the realm whose face value was less than its copper content.

"Zinc, on the other hand, is already far above any figure ever reached in the history of the metal.

"The general changes which have taken place in the value of money and in our conceptions of cost and worth will, of course, account for some increase, such as we have seen in most commodities, but the present astronomical figures are not due solely to monetary causes; still less are they due to any natural cause in the way of absolute shortage or of insuperable mining difficulties.

"They are due, first and foremost, to the fact that, five years after the war, we are still operating under the wartime system of bulk purchase. The London Metal Exchange is closed for dealings in copper and zinc, and, under the arrangements made between the Ministry of Supply and the Empire producers, the price paid for the whole of our imports is linked at a devalued rate of exchange to the transatlantic price. This price itself is largely influenced by the stockpiling policy of the American Government and bears no direct relation to production costs. The Ministry of Supply is to-day taking approximately £6 a ton above the f.a.s. New York price for copper and £7 10s. a ton for zinc."

Burden of Costs

"There is every reason for alarm at the high level of costs to-day, especially when it is borne in mind that the element of raw material accounts for anything up to 90 per cent of the cost of the articles we sell. This heavy burden has to be borne by all the manifold and varied industries which use our finished products, including some of those which are making the most valuable contribution to British exports to-day, such as the motor industry, electrical engineering and cables, shipbuilding, and general engineering.

"It is an inescapable economic law that, where the price of an article remains for a long period substantially out of relation to the price of its potential substitutes, the user is bound to turn to such substitutes. We here know that, for practically all its present applications, there is no acceptable substitute for copper and its alloys, but there are several materials which are not a bad second best for certain purposes, and one can foresee a situa-

(*continued on page* 82)

PRODUCTION PROSPECT FOR POLYSTYRENE

First Stage in a New British Plastics Industry

PRODUCTION of the first polystyrene made commercially in the United Kingdom is to begin at the middle of this month. Announcing this, Monsanto Chemicals, Ltd., which is undertaking the innovation at its Newport works, says that this thermoplastic injection moulding material has come to be regarded as one of the most versatile of the plastics in the U.S.A.

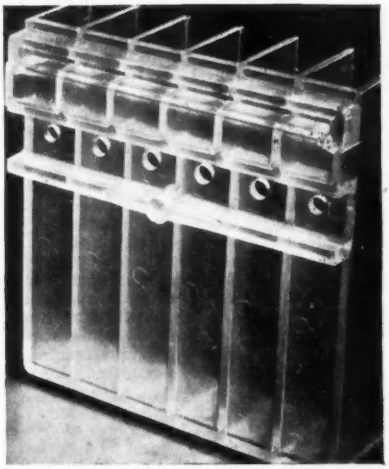
The Monsanto product, Lustrex, is a hard substance which will be available both in its natural colourless form and in colours. Its resistance to water, acids, alkalis, fats and waxes is very high. The company states that its electrical characteristics are outstanding and that it has the best insulating properties of all synthetic resins.

Dependence on Dollar Sources

The only large-scale source of polystyrene for British industry has hitherto been the United States and Canada, and a condition of its importation in Great Britain has been that 90 per cent of the end products should be exported. Production at Newport should result in some relaxation of restrictions on home market uses and permit an increase of exports of plastic products. It will also yield a valuable dollar saving in the sterling area.

The story of Lustrex, says Monsanto, exemplifies a peacetime industry developed from a wartime priority need. Before 1939 the thermoplastic was made on a relatively small scale from styrene monomer. After 1939, styrene monomer was needed in great quantity for manufacture of American synthetic rubber and production was increased accordingly. Monsanto built the Texas City plant on U.S. Government commission and, after the war, bought the plant for its own use.

The new Lustrex unit at Newport



This example of battery casing represents another important use for which the high resistance to heat, shock and acids makes polystyrene particularly appropriate

British production will initially be based on imported styrene, but later requirements will be met by indigenous production. Forth Chemicals, Ltd., will produce styrene monomer at a new plant to be erected in Scotland.

In the United States, Lustrex is already used in a wide range of industrial and household products, which with freer supply of Lustrex, should become increasingly available here.

Notes from the U.S.A.

A number of indications of the likelihood that the advent of polystyrene polymer will have important effects in U.K. plastics industry are to be found both in the

interesting chemical and physical properties of the material and the high rate of development since it was introduced in the U.S.A.

Discussing the possibilities in London last week, Mr. E. A. O'Neal, jun. (chairman of Monsanto Chemicals, Ltd.) mentioned the expectation of providing in this country an adequate supply of monomeric styrene, from which the plastic is produced by polymerisation, from the ethylene gas which would come from the new refinery at Grangemouth. That should be completed in two years. The other source was benzene from coal, so that there were excellent prospects for production from indigenous supplies.

To indicate how wide were the fabricating possibilities, an extremely varied display of Lustrex products, sent by the American Monsanto Company, was put on view. It fully confirmed some of the claims made for this material, such as its ability to serve as a successful replacement of glass, metal and wood in most applications and some very original ones. All the pieces reflected the good injection moulding properties, low weight and colour effects. A useful characteristic is the ability to produce at one shot either small items (toys and fruit punnets weighing an ounce or two) to refrigerator parts and kitchen cabinets. Some of the latter may weigh up to about 20 lb.

Other indications of good prospects for the new polymer were the facts about the extremely rapid expansion witnessed in the U.S.A. outlined by Mr. J. Turnbull, on a visit to London from the American company. He indicated how general is the acceptance of plastics in the U.S.A. by the fact that distribution in 1949 was estimated to be about 11 lb per head of the population (against about 2 lb. in this country) and it was estimated that by 1953 the *per capita* figure for plastics in the U.S.A., in free competition with metal, glass and wood, would be 15 lb. This year the Monsanto Chemical Company would produce 240 million lb. of Lustrex, of which the total in 1945 was 6 million lb. The company was producing yearly 80,000 tons of monomeric styrene for plastics and some of the synthetic rubbers.

INFLATED METAL COSTS

(*continued from page 80*)

tion in which British industry might well be compelled, for reasons of price, to turn to newer materials. This would be to the detriment not only of our own industry, but also, in the long run, of their own products which would be less efficient for their purpose.

"Such a situation, if carried too far, might at no very distant date have very serious repercussions on the world mining situation, and, if a number of our mills were forced to close down, on the strategic position of this country and her allies near and far. I cannot too strongly emphasise the Federation's view that it is vital that the prices of copper and zinc, and other non-ferrous metals, should come down to a more reasonable level at the earliest possible moment.

"I have so far been speaking chiefly of the absolute level of prices, but it should also be borne in mind that manufacturers in this country are in certain respects at a disadvantage compared with those in other countries who are able to obtain their raw materials at prices more closely in line with the so-called world price. This disparity might well develop into a serious competitive weakness for the exporting industries of Great Britain.

"This is perhaps an appropriate moment to pay tribute once again to the excellent understanding which exists between the representatives of the Ministry of Supply and of the federation, who are in the habit of meeting at regular intervals to discuss the problems of the industry. So far as it is possible, within the limits of Government policy, with which we do not agree, we find the officials of the Ministry of Supply most helpful and understanding. In fact, the only criticism we have against them is that they should not be in the business at all!

"I should mention one important point in connection with price levels in which the federation has obtained a certain degree of satisfaction from the Ministry. I refer to the premiums for forward purchase which, on our representations, were recently substantially reduced, thereby minimising to some extent the disadvantages at which we have been placed. This is a step in the right direction and we welcome it as such.

"We are, however, still constant to our conviction that the only way to restore sound health to the metal world is to put an end to the present system of bulk purchase by the Government, and to restore free trade in all metals."

Japan Mining More Pyrites

Japan's monthly average pyrites output mounted last year to 127,900 tons, as compared with 94,800 tons in 1948 and only 33,700 tons in 1945.

SOAP RATIONING TO END

Improved Supply of Raw Materials

AN end of soap rationing, which has been in force since February, 1942, was announced by Mr. Maurice Webb, Minister of Food, in the House of Commons this week. The present ration system, which provides 24 oz. a person for each eight-week period, will cease on September 10.

In his statement, Mr. Webb said that the recent improvement in supplies of raw materials had enabled the further extension of free buying of this essential domestic commodity.

"This improvement," he said, "is so substantial and, on the most careful estimate, certain to continue that I have found it possible to proceed at once with complete derationing instead of taking the interim step of increasing the ration. I am making the announcement now to enable manufacturers to use their raw materials to produce enough soap, including soap powders, to meet the probable demand when rationing stops."

Mr. J. Harrison asked if the Minister had made sure that there would be no shortage of certain qualities of soap. Mr. Webb: I think we have over-insured ourselves against that possibility.

Dr. Somerville: Is the Minister satisfied that, when soap is derationed, the prices of various kinds will not be raised?

Mr. Webb said that prices would continue to be controlled. He added that the Ministry would also maintain control over the distribution of raw materials, but manufacturers were quite happy about the arrangements made.

A note from the Board of Trade points out that up to September 10 the soap rationing scheme will also continue to operate in full for traders, and order forms and buying permits relating to supplies for the eight-week period beginning on August 13 should continue to be passed to suppliers in the normal way.

Cyanide Gas Fatality

The starting of a compressor engine which caused the air in the engine-room to circulate and brought in a pocket of cyanide gas, with which the ship had been fumigated, was said by a Bibby Line official to be the cause of 42 seamen in the 10,600-tons liner *Cheshire*, berthed at Birkenhead, being affected by the gas recently, one of them fatally. He added that, after the incident, the vessel was soon cleared of gas and normal work resumed.

U.K. EXHIBITS AT CHICAGO

Only Two Chemical Groups

AMONG the 150 British firms whose names appear in the early list of intending exhibitors at the Chicago International Trade Fair (August 7-20) are only two actual manufacturers of chemicals, Imperial Chemical Industries, Ltd., and the Watford Chemical Co., Ltd. In addition to these, however, there are several British exhibitors of allied products, including the Furmoto Chemical Co., Ltd., who are manufacturers of metal, shoe, furniture, etc., polishes, and Bakelite, Ltd.

The stand of I.C.I., Ltd., at Chicago will be designed to present products, services and scientific achievements. It will be the first time that I.C.I. has exhibited in the U.S.A., and space limitations will permit only a small cross-section of the company's 1200 products to be shown. The display will show how the company's overseas selling organisation covers nearly every country in the world except Russia and some of her satellites. Among the products of the I.C.I. £11 million yearly research programme to be shown are Paludrine, Methoxone, Polythene, the Gammexane range of insecticides, and Antrycide.

There will be a series of diorama models showing users of colour throughout the ages. These were originally shown on an I.C.I. stand at the BIF in London.

Corroded Boiler Exploded

QUESTIONS about the chemical action of water on metal boilers were asked at the resumed inquest at York on July 4 on Arthur Henry Horwell, 48, boiler cleaner, of York, who was killed when a boiler at the Foss Islands power station exploded in the early hours of October 27, 1949. A verdict of "Accidental death" was returned. The explosion wrecked the boiler house, and Horwell's body, buried beneath the debris, was not recovered until seven days afterwards.

The official inquiry into the explosion is being conducted on behalf of the Ministry of Transport by Mr. John George Charlton, senior engineer and surveyor, who stated that he found in the boiler a crack from the outer row of rivets which stretched practically the whole length of the drum. The cracks were not due to stresses, and the evidence suggested that the explosion was due to some form of stress corrosion.

Basic Chemicals in April

Generally Higher Production Levels

PRODUCTION levels of basic chemicals in April were generally higher than in the same month of 1949, but stocks of sulphur and pyrites declined. Figures for molasses and industrial alcohol in April 1950 are not yet available, but among fertilisers there was an increase in production and consumption. Among the non-ferrous metals, production rose except in aluminium and magnesium, while, apart from zinc, stocks improved. Stocks of refined lead and zinc concentrates were about doubled.

Estimated numbers employed in the chemical and allied trades for April (in thousands) were 444.0, being an increase of 12.4 over the corresponding month in 1949, and slightly higher than in March this year. Distribution of workers was as follows: coke ovens, chemicals and dyes, explosives, etc., 256.8 (189.0 men, 67.8 women); paints and varnishes, 38.3 (27.2 men, 11.1 women); oils, greases, glues, etc., 66.9 (53.8 men, 13.1 women); pharmaceuticals, toilet preparations, etc., 82.0 (42.8 men, 39.2 women).

These figures and the table below are abstracted from the *Monthly Digest of Statistics*, No. 54 (H.M.S.O., 2s. 6d.).

	April, 1950 Thousand Tons			April, 1949 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	151.6	147.0	—	139.2	135.0	—
Sulphur	—	29.8	66.8	—	24.7	72.3
Pyrites	—	18.8	71.0	—	20.6	76.0
Spent oxide	—	16.4	179.9	—	15.9	168.0
Molasses (cane and beet)	9.0*	41.1*†	227.6*	10.3	26.8†	284.2
Industrial alcohol (mil. bulk gal.)	2.69*	2.75*	0.61*	1.86	2.39	5.07
Ammonia	—	7.24‡	6.23	—	6.88	5.96
Superphosphate	19.1	28.4	—	18.1	22.0	—
Compound fertiliser	173.6	233.1	—	142.2	210.4	—
Liming materials	—	457.8	—	—	430.9	—
Nitrogen content of nitrogenous fertilisers	22.17	22.2	—	21.7	19.8	—
Phosphate rock	—	86.9	256.8	—	82.1	174.7
Virgin aluminium	2.43	12.2	—	2.66	15.8	—
Virgin copper	—	25.2	127.9	—	23.6	115.4
Virgin zinc	5.35	17.5	46.6	4.79	13.6	50.6
Refined lead	5.55	9.6	61.5	3.17	10.6	37.5
Tin	2.40*	2.23	—	2.37	1.66	20.5
Zinc concentrates	—	13.5	69.0	—	10.9	31.6
Magnesium	0.42	0.46	—	0.52	0.46	—
Pig iron	183.0	143.0	484.0	179.0	139.0	243.0
Steel ingots and castings (including alloys)	324.0	—	1,320.0	305.0	—	1,097.0
Rubber: Reclaimed	0.43‡	0.40‡	2.50	0.32‡	0.40‡	3.62
Natural (including latex)	—	4.20‡	39.6	—	3.28‡	47.0
Synthetic	—	0.05‡	0.84	—	0.04‡	1.82

* March, no April figures available, 1950. † Distilling only. ‡ Average of five weeks.

Canadian Synthetic Resins Development

MONSANTO (Canada), Ltd., in Montreal, has started an $850,000 programme for expansion and production of new materials. The most significant item will be the installation of equipment to manufacture for the first time in Canada butylated melamine and urea resins. These are important components in the newer type of baked enamels being widely used for automobile, stove and refrigerator finishes.

This marks another important step in raw material self-sufficiency in the fast-growing Canadian plastics industry. Prior to this all these resins have been imported from the United States. Monsanto and Dow Chemical of Canada already meet the entire domestic requirements of polystyrene, one of the largest items in the raw materials picture. At the moment, neither the American or Canadian plants can satisfy the demand for this product. Another feature of the new production plan is the projected setting up of installations for the manufacture of PVC resin and enlarged equipment to modernise production of liquid phenolic and urea resin glues for the plywood and furniture industries.

Parliamentary Topics

THE REBATE or deduction on home produced hydrocarbon oils was again the subject of discussion during the consideration of the amended Finance Bill. Mr. Selwyn Lloyd moved that an amendment should give a guarantee that any such deduction would not be diminished for a period of 12 years. The industry, he said, was now at a critical stage of its development and re-equipment, and needed security. If the preference was diminished or disappeared, home production of benzol from coal gas might become uneconomic, and more oil would have to be imported. Distillation and recovery plants might well have to close down and the profitability of coke oven plants would be affected. There would be an indirect effect upon the chemical industry.

Supporting the amendment, Mr. Aubrey Jones said that if a preference was terminable at a moment's notice (as could happen as the Bill now stood) there was clearly no inducement for the industry to re-equip. The period of 12 years was the average life of the necessary plant.

Mr. Douglas Jay, Financial Secretary to the Treasury, agreed that a case had been made out for continuing the preference at present enjoyed by indigenous hydro-carbon oils. He could not, however, see the force of a specified number of years. Security rested not so much on a guarantee as on the good sense of future Governments and Parliament.

The amendment, which was also supported by Lt.-Commander Guernsey Braithwaite, Sir David Maxwell Fyfe and Sir H. Williams, was defeated by 275 votes to 252.

PROGRESS of British national research with the problem of harnessing atomic energy for industries, travel and other peaceful purposes was raised in a question by Mr. Hector Hughes. Replying, Mr. G. R. Strauss, Minister of Supply, stated that considerable progress had been made in preliminary planning of nuclear reactors for use as power units. New high voltage machines and other facilities required for investigating components and materials which may be used in such reactors have been completed at Harwell. A programme for the construction of the first experimental power reactors was being prepared. Deliveries of radioactive isotopes from Harwell for medical, scientific and industrial use were meeting all home and export demands.

THE sanctioning of the establishment of an oil refinery approximately opposite that at Fawley across Southampton Water, were questioned by Surgeon Lt.-Commander R. Bennett. The decision to erect a new oil refinery plant somewhere off Southampton Water between Southampton and Portsmouth was reached after thorough investigation, stated Mr. G. Bottomley, Secretary for Overseas Trade, in a written answer. Suitability of sites in other parts of the country and proximity of markets for the refined product had been taken into consideration.

PROBLEMS concerning the recognition of a minimum standard of efficacy of disinfectants were raised by Dr. Charles Hill, who asked the Minister of Health if he would consult the Medical Research Council on this matter. Mr. A. Bevan, in replying, stated that he was already in touch with the Medical Research Council and had asked the technical authorities to lay down standards. Although the matter had now been pursued for nearly five years, the intricacy of the problem was such that no standards had yet been achieved.

MR. G. R. CHETWYND asked the Minister of Works why German cement was being offered for sale at West Hartlepool at double the price of home cement. Mr. R. R. Stokes, the Minister, replying, said that this was being imported by private firms and the selling price was not controlled. The 80,000 tons of cement and clinker ordered by his Department was being sold at the price of home cement.

QUESTIONED about the accident at the Consett Iron Company's works, Durham, on July 1, Mr. J. Freeman, Parliamentary Secretary to the Ministry of Supply said that the cause of the escape of carbon monoxide gas was being investigated by one of His Majesty's inspectors of Factories. He expressed the sympathy of the House for the bereaved relatives and the injured.

More Chemicals Liable to KID

Additions, from July 1, to the list of chemicals liable to Key Industry Duty, are: *a*-azoisopropyl cyanide; ethylenethiourea; barium manganate; benzyldimethylcarbinol; benzyldimethylcarbinyl acetate.

CONGRESS OF WORLD MICROCHEMISTS

Some British Contributions to Analysis

THE first international microchemical congress was held in Graz, Austria, from July 2-6. Twenty-six countries were represented and 113 lectures were given.

Among the papers read by the United Kingdom scientists was one by R. Belcher and R. Goulden, of Birmingham, on "The determination of carbon and hydrogen in fluorine-containing organic compounds." The method given is that the combustion of the sample, contained in a silica combustion tube, is effected in a purified oxygen stream at a flow-rate of 4 ml./min. Oxidation of the products of combustion is completed by passing them over a platinum contact heated to 750°C., after the manner of Friedrich. Silver wool at the same temperature ensures removal of sulphur and halides, including fluorine from any hydrogen fluoride produced. Granular sodium fluoride at 250°C. is used to absorb silicon tetrafluoride. The water vapour and carbon dioxide are determined in the usual way by absorption in magnesium perchlorate and soda-asbestos respectively.

Results

Satisfactory results have been obtained in the analysis of 4 mg. samples of compounds containing the elements C, H, O, F; the standard deviation of the results for hydrogen being about ±0.1 per cent H and for carbon being about ±0.2 per cent C. Preliminary work indicates that compounds which contain no hydrogen—the $C_n F_m$ type—may be analysed if water-vapour is introduced into the system. Analysis of nitrogen-containing compounds has yet to be tried. The apparatus includes certain refinements which are suitable for incorporating in the conventional procedure.

Another interesting paper was that read by A. K. Al Mahdi and C. L. Wilson, of Belfast, who presented "The separation of metal-organic complexes." The first point made was that various separations of ions by so-called inorganic chromatography on alumina and similar columns have been described in the literature.

However, the processes involved are properly regarded as ion-exchange rather than true chromatographic adsorption. Partly because of this, theoretically complete separations are not achieved by this method, the bands formed by different ions usually overlapping to a greater or less extent. The method of passing solutions of ions through columns consisting of, or impregnated with, organic reagents equally cannot be regarded as true chromatography, since it is probably dependent on the relative solubilities or stabilities of the complexes formed *in situ* on the column. Since many complexes formed between inorganic ions and organic reagents behave as covalent compounds and are soluble in organic solvents, true chromatography of suitable mixtures of these complexes should be possible, resulting in separations strictly comparable with those achieved in the organic field.

A number of excellent separations of this nature have been achieved. The sensitivity of these is high, and they are notably different from the earlier methods in that, as in partition methods, the bands due to the different metals are completely separated.

A further British treatise was that of G. F. Hodsman, of London, who dealt with "Developments in microchemical balance design." After a brief historical introduction and some observations on the importance of the balance as a tool in microchemical analysis, reference is made to the need for a clearer distinction between the meaning of the terms "sensitivity" and "precision" as applied to microchemical balances. These terms are defined and the factors, such as observational, instrumental, and conditional errors which affect precision, are briefly reviewed.

The design of the modern microchemical balance is discussed, showing how new methods and techniques enable the chemist to obtain higher sensitivity and precision. Reference is made to new theories concerning the design of more reliable bearings, and the possibilities of new bearing materials are considered. The design of microchemical balance beams is discussed, and the importance of corrosion resistance, non-magnetic materials, strain relief, and stress analysis is emphasised.

Standardisation

Reference is also made to the value of standardisation of physical dimensions of microchemical apparatus, as a first step towards standardisation of weighing facilities provided on microchemical balances. The inter-relation of sensitivity and precision is considered from a theoretical viewpoint, and the practical applications of the results are mentioned, showing how specifications should be compiled so as to be of maximum value to the microchemist.

DETERMINING MINERAL NUTRIENTS

Microbiological Aspects of Bioassay

AT the meeting of the Fertiliser Society at Bristol recently, Dr. D. J. D. Nicholas read a paper dealing with a method of determining mineral nutrients in soils and plants, using *Aspergillus niger*. Because of the extreme sensitivity of the method, especially for Mo, it has been used to determine micronutrient levels in extracts of fresh plant tisues and in the ash of plants.

Dr. Nicholas explained that the bioassay method applied to soil problems has shown Mg deficiency in the presence of K deficiency, a point not detected by the chemical analysis of crop plants. Deficiency of Cu in alkaline fen soils was shown, where cereal crops were affected, and in sandy soils where fruit trees had dieback symptoms. Other deficiencies shown by this method were those of Zn in a soil where apples and pear betrayed "little leaf" effects; Mo in acid soils where brassica crops exhibited "whiptail" symptoms and Mn in soils where farm and vegetable crops show deficiency.

Microbiological methods for the determination of mineral nutrients in soil using fungi of the genus *Aspergillus* were introduced by Russian workers mainly for the determination of P in soils. Smith and Goodwin respectively have used the method for the assay of available P and K in British soils. Steinberg has made a thorough investigation of the mineral requirements of *Aspergillus niger* under differential supply of C and S compounds. Smit and Mulder have used the fungus to study the available Mg and Cu in Netherland soils.

Essential Nutrients

The method of bioassay proposed is based on the fact that the fungus will not complete its life cycle unless certain mineral nutrients are present in the culture medium. These are the macronutrients N, P. K, Mg and S, and the micronutrients Zn, Cu, Fe, Mn, Mo and possibly Ca, and V. The response to the addition of an essential mineral element from deficiency to sufficiency levels, when others are present in adequate supply, is specific and quantitative.

The standard growth series for an essential mineral element may be prepared by using as criteria the growth of mycelium, development of spores and dry weight yields of the fungus. For bioassay work a known amount of the test material to be examined, *viz.*, soil, extracts of fresh plant tissues, or the ash constituents of plants, is added to a standard culture solution containing all the mineral elements other than the one to be determined. The growth of the fungus, under condition of test, depends on the amount of mineral nutrient it derives from the material added, and the test element may be assessed by reference to the prepared standards.

Purification of Dextrose

Special procedures for the purification of the mineral macronutrients and dextrose used in the culture solution are necessary for the bioassay of Mg, Cu, Zn, Fe, Mn and Mo respectively. The following nutrients may be removed from a solution of inorganic mocronutrients and dextrose:

Magnesium. Recrystallisation of precipitation with 8-hydroxyquinoline at *p*H8. (Phosphates are omitted in the latter method of purification as they are precipitated in alkaline solution).

Iron. Co-precipitation as a quinolate in the presence of Fe, using 8-hydroxyquinoline at *p*H 5, and, after filtration, the removal of the residual quinoline with redistilled ether.

Copper. Removal with dithizone CCl_4 at *p*H 4, or precipitation with added Cu or Cd as a sulphide, using H_2S. Elimination of H_2S by boiling.

Zinc. Extraction with dithizone in CCl_4 at *p*H 6 or co-precipitation with Fe using 8-hydroxyquinoline at *p*H 5.

Molybdenum. Co-precipitation with Fe or Al with 8-hydroxyquinoline at *p*H 5, or (preferably) as a sulphide in the presence of Cd, Cu, Hg and Pb using H_2S. The addition of I_2 in KI simultaneously with H_2S precipitation facilitates the removal of further amounts of Mo, presumably because there is formed colloidal S which acts as an additional collector of the element.

Manganese. Using sodium diethyldithiocarbamate, and removal of the complex in CCl_4. Excess organic reagent is removed by the addition of Cu, and excess Cu by precipitation as a sulphide.

In all instances the purified mineral macronutrients and dextrose are used for the full nutrient cultures and the micronutrients are added later. Following this

procedure, any phytocidal effects caused be observed. Mineral micronutrients, of analytical reagent standard, for test are analytical reagent standard for test are recrystallised from glass-distilled water, using redistilled alcohol to enhance yields. Their purity should be checked by spectrograph before use.

Using these methods satisfactory growth curves are obtained for the following mineral nutrients, as μg per 50 ml culture solution:—Mg, 25 to 500; Cu, 0.05 to 2; Zn, 0.1 to 5; Fe, 0.01 to 5; Mn, 0.01 to 2; Mo, 0.0001 to 0.02.

Metabolism of the Fungus

In conclusion, Dr. Nicholas pointed out that little is known of the rôle of the micronutrients in the metabolism of the fungus. Molybdenum is required for the reduction of the nitrate N to ammonia N, as indicated by the fact that its requirement for Mo is considerably reduced when urea N or ammonium N is the only source of nitrogen. Moreover, in the absence of Mo, when nitrate N is the sole source of nitrogen, nitrate N accumulated in the fungus, and little amino N was detected, as in the instance of a trace of glutamic acid only. With more Mo, however, the nitrate N fraction decreased and the free amino N increased in the fungus, thus indicating that nitrogen metabolism was proceeding more normally.

Field to be Explored

The extent of the field yet to be explored in determining the function, and in some cases the identity, of mineral trace elements as plant nutrients was made clear by Dr. E. J. Hewitt in a paper describing the production and effects of micronutrient deficiencies in sand and water culture techniques.

He made clear the exacting requirements to prevent contamination made necessary by the extremely small quantities involved. Accidental inclusions might, for example, occur through the deposition of dust or through precipitation. Sufficient zinc for the season's growth of a plant may well be conveyed by air-borne dust, as the considerable accumulation on a glass slide in one month of all micro-nutrients went to show.

The molybdenum content of the seed of beans or the copper content of rye was known to modify the response of the plants grown with these deficiencies. In the search for yet unrecognised micronutrients the composition of the seed may require consideration.

The gaps in present knowledge were indicated by such facts as the recent identification at Wisley, by Wallace and others, of copper deficiency as the cause of exanthema and summer die-back of apple trees.

While molybdenum deficiency had only recently been identified in the field, other micronutrient deficiencies of higher plants were not yet known.

Reports on the need for aluminium, silicon, chlorine and gallium needed substantiation and little work had yet been published. Recently it had been shown that cobalt was essential to the production of a growth factor by certain micro-organisms (*Lactobacillus* and *Staphylococcus*), and this element might yet prove to be a plant micronutrient.

The consideration of deficiency effects could not exclude some study of the fact that toxicity may also occur in some instances. Excess of zinc or copper readily induced iron deficiency in many plants and excess of manganese might produce characteristic toxic effects such as leaf cupping and decrosis in *Brassicae*, or iron deficiency, as in oat or soya bean.

Excess of boron caused scorching of older leaves in many plants and might resemble lack of potash. Molybdenum excess might appear as blue or yellow pigmentation, due to combination with anthocyanins or tannins, or resemble ammonia toxicity.

The effects of excess of zinc or manganese, especially with respect to iron deficiency were greatly accentuated by additional molybdenum, and it might be concluded that the interrelationships and rôles of these elements were complex and still far from completely understood.

Overseas Research Scholarships

OVERSEAS research scholarships for 1950 of £350 or £400 a year for two years, announced this week by the Royal Commission for the Exhibition of 1951, included the following:—

CANADA: N. R. F. STEENBERG, (Queens University, Kingston, Ontario), nuclear physics at Oxford University; R. M. STOW, (Saskatchewan University), physical chemistry, Cambridge University.

AUSTRALIA: F. A. L. ANET, (Sidney University), organic chemistry, Oxford University; P. J. FENSHAM, (Melbourne University), physical chemistry, Bristol University; L. M. JACKMAN, (Adelaide University), chemistry University College, London; P. M. NOSSAL, (Adelaide University), biochemistry, Sheffield University.

NEW ZEALAND: L. S. WOLFE, (New Zealand University), animal physiology and biochemistry, Cambridge University.

INDIA: R. C. SAHNEY, (East Punjab University and National Physical Laboratory, Delhi), physical chemistry, Cambridge University.

PAKISTAN: R. AHMAD, (Punjab University), chemistry, Cambridge University or London.

REPUBLIC OF IRELAND: S. R. DUFF, (Dublin University), organic chemistry, Oxford University.

RAW MATERIALS FOR PAINTS

International Agreement on Standards

THE first meeting of the technical committee for raw materials for paints was held in Zurich from June 26 to June 30. This is a revival of a pre-war committee, formerly part of the International Standards Association, which has since been replaced by the International Organisation for Standardisation.

It was agreed to begin from the point reached by the work in 1939. It is not intended that any agreements reached should be published as international standards, but they are to serve as a basis of national standards in the various countries, of which 11 were represented at the meeting.

The British delegation, organised by the BSI, was led by Mr. E. W. Plowman. Other members were Dr. A. Bowman (titanium pigments), Mr. G. Claxton (solvents), Dr. H. Mills (fine pigments), Dr. C. W. Price (lead pigments), Dr. L. A. Jordan and Mr. P. Cutbush.

It was agreed that the general scope of the pre-war committee should be continued, and that the work should be confined to raw materials, and should not include finished paints. The United Kingdom was asked to undertake the secretariat of a sub-committee for the subject of terminology.

A draft specification for red lead was discussed and a revised draft will shortly be circulated for the approval of the co-operating countries, when final agreement has been reached on certain of the test methods.

White Lead

A draft specification for white lead was also accepted, again subject to agreement on certain test methods. There was considerable discussion of the methods of determination of oil absorption, reducing power and hiding power of pigments, in order to set up a basis on which acceptable test methods might be drafted. This resulted in the United Kingdom being asked to act as secretariat of a sub-committee for test methods and sampling generally.

There were discussions concerning zinc oxide and lithopone and, on the tentative agreements reached, draft specifications are to be founded. It was agreed that the draft for zinc oxide should set out the requirements for three qualities, extra pure, normal and "lead-containing", the last to have a maximum of 3 per cent Pb. For lithopone it was decided at present to confine the draft to one quality only.

In the oil group the limits agreed and the methods of test for linseed oil for paint, boiled oil and refined linseed oil were very close to the current British Standards. It was agreed to consider the inclusion of a test for the presence of fish oil and also a simple method for the measurement of "foots". It was agreed that a draft for tung oil should be prepared on the basis of B.S.391-1949 and circulated for comment.

Dehydrated Castor Oil

There was general agreement that the time was not yet ripe for a specification for dehydrated castor oil. As a result of the consideration of a preliminary draft for stand oil for zinc oxide it was agreed that a draft should be prepared for stand oil for all purposes and not merely for oils suitable for use with zinc oxide.

In regard to titanium it was agreed, at present, only to standardise the anatase and rutile forms of titanium dioxide, and not to include the reduced types. There was general agreement as to the specification and the United Kingdom was asked to prepare a draft.

A draft specification for turpentine, prepared by France, resulted in the decision that the word "turpentine" should be confined to gum spirit of turpentine and that the specification should deal only with this material. The secretariat had put forward drafts for a series of aromatic hydrocarbon solvents but, after discussion, the conference felt that, since the use of these materials was so much wider than the requirements of the paint industry, it would be advisable for the International Organisation for Standardisation to set up a separate committee to deal with these materials, and inform this committee of the interest of the paint industry in certain types.

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100 Guineas from the Pharmacists

In token of appreciation of gifts from overseas to old and distressed chemists, the Pharmaceutical Society of Great Britain has sent 100 guineas to the Lord Mayor's Thanksgiving Fund.

RADIOMETRIC ASSAY AND RADIOACTIVITY

Principles and Methods of Measurement

THE method adopted of assaying a particular radioactive isotope has depended upon the nature and energy of the radiation associated with its decay, and upon such factors as the required sensitivity, precision or convenience. The last factor may be of overriding importance when dealing with the frequently large numbers of samples of a tracer experiment, stated Mr. F. P. W. Winteringham in a paper on "Radiometric Assay in Tracer Research," presented at a recent meeting, in London, of the Physical Methods group of the Society of Public Analysts and other Analytical Chemists.

Self Absorption of Tritium

Tritium, he said, decayed with such weak beta-emission that it ought to be assayed as a gas within the sensitive volume of a Geiger-Müller counter or ionisation chamber attached to a suitable electroscope. Self-absorption alone precluded its assay in external samples. Active samples had been recovered as water by ignition in oxygen.

Carbon$_{14}$ was most efficiently assayed as carbon dioxide within the sensitive volume of a gas counter. It might be assayed in prepared solid samples placed outside a thin window counter. The second method was much more convenient but much less efficient than gas counting.

Solid samples, however, might also be assayed by placing them inside a demountable counter through which was flowing a mixture of helium and alcohol vapour. This method had been found to be a useful compromise between the internal gas and external sample methods; its efficiency had been estimated to be about 30 per cent as compared to about 70 per cent obtained with a typical gas counting assembly and 10 per cent obtained with the thinnest end-window counter commercially available.

Bromine$_{82}$ decayed by the emission of beta particles and energetic gamma rays, which permitted a choice of methods according to the activity available. Active samples could be compared quite accurately at a distance from a suitable gamma-counter and self-absorption corrections were unnecessary.

High efficiency assay was achieved by suitably mounting silver bromide precipitates below a thin window counter. An experimental self-absorption curve obtained under these conditions agreed very closely with the curve calculated on the basis of the beta particle absorption alone.

Another paper, on "Radioactivation Analysis—Some Glimpses of its Scope," was by Mr. A. A. Smales, who said the principle of radioactivation analysis was that any element, or in fact isotope, which could be made radioactive could also in theory be determined by measuring this induced radioactivity. The potential scope of the method was therefore very wide, since many types of nuclear reactions were possible, and radiosotopes of almost all elements could be artificially produced. For example, with slow neutrons in a nuclear reactor, over 80 elements gave rise to active isotopes, many of which were convenient from an analytical point of view.

The potential sensitivity depended mainly upon the neutron flux available and the activation cross section of the particular element or isotope concerned. If a figure of 100 disintegrations per minute (*i.e.*, at least double the normal beta-particle background of the usual end-window Geiger tube assembly) were accepted as a limiting sensitivity for determination, and a flux of 10^{12} neutrons per sq. cm. per sec. assumed to be available (*e.g.*, in the Harwell pile), then it should be possible to determine several elements in quantities from 10^{-12} g. (*e.g.*, Eu, Dy) through 10^{-11} g. (*e.g.*, Ir, Rh, In, Tm, Lu, Sc, Au, Ag, Ho, Co, etc.) and upwards.

Activity of Sample and Standard

In usual practice the samples were irradiated simultaneously with standards, but not necessarily of the same general composition, but containing a known weight of the element concerned. The required element was chemically separated after the addition of an inactive carrier element—although in some favourable cases it might be possible to omit this step. Then the activities of sample and standard under similar conditions were measured after determining the chemical yields by conventional means; and by checking the radiochemical purity by decay and absorption measurements it was possible to calculate the weight of the element originally irradiated.

(*continued at foot of next page*)

ETHYLENIC COMPOUNDS

New Method of Synthesis

A NEW method for the synthesis of unsaturated compounds, particularly those containing one or more ethylenic groups adjacent to a carbon atom, has been developed in the organic laboratories of the Imperial College of Science at South Kensington. This has been described by Dr. E. A. Braude, Dr. C. J. Timmons and J. A. Coles, the workers concerned in the development of the method (*Nature*, 66, *4210*, 58). The method depends upon the preparation of the alkenyl lithium derivatives, and on their reactions with secondary components. Previously, it had been found difficult to synthesise certain tautomeric systems from α-alkenyl compounds because of the difficulty in preparing the Grignard reagents of this type, and also because of the complications encountered in some of their reactions.

Hence the possibility of using the corresponding lithium derivatives was considered, and, though the existing literature was discouraging—styryl lithium was said to be formed no more readily than the magnesium compound—yet it was found that highly purified isobutenyl bromide reacted readily with lithium metal in dry ether. Carbonation with excess solid CO_2 and isolation of the products yielded a mixture of 2:5 dimethylhexa-2:4-diene, β:β-dimethylacrylic acid, and phorone.

This novel method of alkenylation complements in some respects the procedures employing acetylenic precursors recently developed, and provides a new and convenient route to many types of ethylenic compounds, a number of which have not been easily accessible up to now.

RADIOMETRIC ASSAY AND RADIOACTIVITY

(*continued from previous page*)

Examples of determinations carried out in the Analytical Chemists' group at Harwell were: rubidium in potassium salts, sodium in aluminium compounds, HfO_2 in ZrO_2, iridium in rhodium—all without chemical separation; and arsenic in "arsenic-free" zinc and in GeO_2 where chemical separation was involved.

Apart from the remarkable potential sensitivity of this method, there was a further advantage that, since an inactive carrier element might be added after irradiation, such difficulties in handling sub-microgram amounts as losses by adsorption, blanks on reagents, etc., were largely avoided. Facilities for irradiation in the Harwell pile were available.

C

TIN RESEARCH

Institute's Laboratory Extensions

THE report on the work of the Tin Research Institute during 1949, which has recently been issued as a 16-page booklet, records the opening of technical service offices in the U.S.A., Belgium and Holland. The alterations and extensions to the institute's premises at Greenford, Middlesex, which are now taking shape, have caused a certain amount of interruption to the experimental work, but advantage has been taken of the altered circumstances by devoting more time to such things as the publication of up-to-date technical publications of practical interest, the institute's series of which now cover all the major applications of tin. Over 45,000 technical publications were sent out in 1949. Thirty-six per cent of the institute's literature went to America and to the United Kingdom 35 per cent.

The first section of the laboratory extensions, comprising a three-storey building, is completed and in use. This houses the institute's chemical and analytical laboratories, the corrosion section, photo-micrographic section, and part of the mechanical testing laboratory. The added space and facilities are stated to enable certain long-delayed projects to be commenced. The second section in the building programme consists of a two-storey building covering the quadrangle within the existing laboratories. This has gone forward more slowly to minimise interruption to the institute's work but is nearing completion. It provides accommodation for the library and information bureau, as well as a writing room and offices on the upper floor, and an engineers' store, heat-treatment department, and a foundry on the ground floor. The third section of the work involves alterations and rearrangements within the existing buildings. In this good progress has been made and the work is expected soon to be completed.

Technical and Scientific Register

THE total number enrolled on the Technical and Scientific Register at May 15, 1950, was shown in the June issue of the *Ministry of Labour Gazette* as 5303. This figure included 3566 registrants already in work but who desired a change of employment; 580 students provisionally enrolled, and 1157 registrants (including 456 ex-Service men and women) who were unemployed.

THE NEW FERTILISER PRICES

The Graduated Increases

THE first substantial rise in about 30 years in prices of chemical fertilisers became effective on July 1. (THE CHEMICAL AGE, 62, 885).

Details of the increases are set out in the Fertilisers (Charges) Order, 1950 (Statutory Instrument No. 1039) and show the rate of additional charge per ton. The principal provisions are these:—

Class I—Not incorporated in a compound fertiliser. (A) Not produced by the fertiliser manufacturer. Sulphate of ammonia £2 6s. 6d. Raw phosphate or phosphate rock, unground: not less than 71 per cent £3 3s. 9d; less than 71 but not less than 61 per cent £2 7s. 10d.; less than 61 per cent £2 1s. 4d. Raw phosphate or phosphate rock, ground, £1 5s. increased or reduced by 2s. 4d. each 1 per cent by which the percentage by weight of phosphoric acid (P_2O_5) in the material differs from 29 per cent.

(B) Produced by the fertiliser manufacturer. Raw phosphate or phosphate rock, ground, £2 7s. 10d. increased or reduced by 2s. 2d. for each 1 per cent as set out above.

(C) Whether or not produced by the fertiliser manufacturer. Ordinary superphosphate of lime £1 17s. 6d., increased or reduced by 4s. 9d. for each 1 per cent by which the soluble phosphoric acid in the material differs from 18 per cent.

Potash (in a form other than sulphate of potash) £2 10s., plus or minus 10d. for each 1 per cent by which the percentage weight of potash (K_2O) differs from 60 per cent. Sulphate of potash 8s. 4d., increased or reduced by 2d. for each 1 per cent by which the percentage weight of potash content differs from 50 per cent.

Compounds

Class II—Compound fertilisers. "Any compound fertiliser: The aggregate of the following rates per 1 per cent of the weight of that compound fertiliser which consists of a substance in respect of which the rate is specified, that is to say—the nitrogen contained in any sulphate of ammonia produced by the manufacturer of that compound fertiliser 2s. 4d.; the soluble phosphoric acid contained in any fertiliser material therein 2s. 1d.; the insoluble phosphoric acid contained in any ground raw phosphate or ground phosphate rock therein 8d.; the potash contained therein otherwise than in any sulphate of potash 10d.; the potash contained in any sulphate of potash therein 2d."

SIR JOHN CASS COLLEGE

Wide Range of Special Courses

STATISTICAL methods in scientific and industrial research will be the subject of a series of lectures by D. R. Read, B.Sc., A.R.I.C., F.I.S., in the forthcoming session of the Sir John Cass College, Jewry Street, Aldgate, E.C.3. The course, suitable for graduates, will consist of 24 lectures on the practical application of statistics to problems of manufacture and research. The first 12 talks, covering statistical analysis, will begin on September 25, at 6.45 p.m., the remainder, on design of experiments, on January 8 ,1951.

Other subjects included in the range of the diverse programme for the new session include the following lectures:

Wave mechanics and molecular structure by Professor C. A. Coulson, M.A., D.Sc., F.R.S. Modern theories of molecular structure for B.Sc. (Special) degree and postgraduate students engaged in industry. (Begins Tuesday, October 31).

Crystal physics and X-ray crystallography will be dealt with by L. A. Thomas, B.Sc., A.Inst.P., in two courses each of 10 lectures. The first, beginning on Thursday, October 5, discusses the physical properties of crystalline solids, and the second, starting on Thursday, January 4, 1951, explains the theory and methods of X-ray analysis.

Spectrochemical analysis, a course of 12 lectures on methods of emission and absorption spectroscopy for chemists and analysts will begin on Friday, September 29, and will be given by A. S. Nickelson, B.Sc., F.R.I.C., and A. R. Philpotts, M.A.

A practical working knowledge of thermodynamics for chemical engineers may be gained from the series of 16 talks by N. W. Roberts, M.A., F.R.I.C., which begins on Tuesday, October 10.

Chemical engineering is also catered for in the course of eight talks by J. M. Coulson, M.A., Ph.D., A.M.I.Chem.E., on heat transfer beginning on Friday, October 6, and in the series of eight lectures on distillation by G. A. Dummett, M.A., A.M.I.Chem.E.

Petroleum products, their applications, characteristics required and their modification, will be the subject of a series of 20 lectures which begin on Thursday, September 28. These will be given by a panel of lecturers experienced in educational aspects of petroleum technology.

Patent and registered design protection will be covered by Eric Walker, B.A., B.C.L., in a course of eight talks beginning on January 25, 1951.

OVERSEAS CHEMISTRY AND INDUSTRY

THE BIRTH OF CHEMICAL INDUSTRIES

Good Technical Background of Development in Israel

by H. REIK, M.Sc. (Eng.), A.M.I.Mech.E., A.M.I.E.E.

ISRAEL is a country of few natural resources. A limited amount of asphalt, gypsum and limestone is available and the main source of chemicals is the Dead Sea. The Palestine Potash, Ltd., used to produce and export quantities of potassium chloride, potassium sulphate, potassium bromide, sodium bromide, magnesium chloride and other chemicals based on the evaporation of large quantities of Dead Sea water in huge evaporating basins.

This process was interrupted by the hostilities, but steps are being taken to restart activities at the south end of the Dead Sea in the territory of Israel.

The lack of other basic chemicals has forced Israel to look for processes which will permit the production of chemicals from easily obtainable raw materials. The by-products of the Haifa refinery, which will soon restart at a small percentage of its full capacity, will be available, and the government has been considering the production of chemicals from petroleum. It is hoped that British firms will collaborate in this enterprise.

Dr. Weizmann with some of the staff of the Institute which bears his name

Many new processes have to be developed and problems peculiar to the country await solution. It is being recognised that these things can only be done by having local research institutes with scientists capable of tackling these problems and having the tools and environment enabling them to work successfully.

This need was realised some years before the second world war by some far-sighted Jewish scientists and particularly by the president of the Jewish State, Dr. Chaim Weizmann. This famous scientist, whose inventiveness helped the allies to win the first world war, is the founder and president of the Weizmann Institute of Science in Rehovoth. This is certainly the most impressive research institute of its kind in the Middle East.

Emphasis on Chemistry

Its spacious grounds are about 12 miles from Tel Aviv and it has been planned with a view of future expansion and congenial working conditions. The buildings are spacious and dignified and shaded alleys lead to the laboratories, workshops and staff quarters.

The main buildings are the Institute of Physics and Physical Chemistry and the Daniel Sieff Institute of Chemistry. New departments and extensions for biochemistry and bacterial chemistry, pharmacology and genetics are planned.

The director of the institute, Dr. Bergmann, is an organic chemist of world-wide reputation, as are many of the senior members of his staff. The research and development work done at the institute has a strong chemical bias. The equipment is first class, a mass spectrometer, electron microscope, X-ray diffraction unit, infra-red and ultra-violet spectrometers, ultra-centrifuge and an electrophoresis apparatus being among the up-to-date tools available. The stores carry sufficient glassware, chemicals and replacements to ensure that work is not held up until spares arrive from overseas. The institute's own instrument workshops have made a large amount of special equipment and are well tooled. The large reference library is kept up to date with publica-

tions of technical value from overseas.

The main investigations in the institute's wide-ranging current work deal with plastics and fermentation processes, using the castor plant for new plastics and continuing Dr. Weizmann's work on the fermentation of plant materials. Work is going forward on the chemistry of proteins and protein foods, cancer producing (and healing) substances, water-soluble polymers, heavy isotopes for organic and biochemical work and many other problems which are considered of importance to the economy of the young State.

Training

Israel trains its scientists mainly at the Hebrew University in Jerusalem which is of the size of an English provincial university. Many of its buildings are now on Arab territory (Mount Scopus) so that the chemistry and physics departments have to work under severe difficulties and with rather inadequate equipment. In spite of these obstacles the standard of work is high, enabling students to gain M.Sc. and Ph.D. degrees.

There can be no doubt that the Government of Israel fully recognises the importance of scientific research and development. It has set up a scientific research council working as part of the Prime Minister's department. Its main aim is to co-ordinate scientific and development work, to finance research projects of value to the country and to assist industrial undertakings which cannot afford their own research and development staff.

Israel has now a comparatively large number of qualified chemists having mainly Continental degrees and experience. There has also been recently an influx of American and English scientists of good standing. The number of locally qualified chemists is also growing, but the demand, especially in certain branches, still exceeds the supply.

The level of industry as such is, as a whole, well behind that of the technical institutions. Many manufacturers have started on a small scale and have not been able properly to plan their processes and production when expanding. Many firms have acquired sites to put up entirely new plants, which in most instances will permit the employment of up-to-date plant and processes.

The chemical industry is still in its infancy, but it is the aim eventually to be as self-sufficient as possible. A large range of chemicals and pharmaceuticals is produced even now, as the following list, representing only those available for export, indicates:—

(*continued at foot of next column*)

Chemicals: Synthetic resins, dehydrated castor oil, cold glue, chemicals for the textile and leather industry, household detergents, cleansing compounds, insecticides (agricultural and household), printing inks, polish (boot and metal), protective sprays for citriculture and live stock (against tick worm and parasites).

Paints and varnishes: Building paints, furniture paints, mirror back paints, asphalt and bitumen varnishes, rustproof paints, industrial paints, dyestuffs for leather industry, metal paints and anti-corrosive paints.

Pharmaceuticals: Sulphonamides, hormones, vitamins anti-allergics, analgesics, anti-spasmodics, diuretics fungicides, ointment bases, antiseptics, laxatives, tinctures, and extracts, cardiatonics, penicillin, olive oil (medical), medicinal herbs.

Cosmetics and perfumery: Toilet soaps, laundry soaps, soap flakes, washing powder, shaving cream and sticks, alum stones, shampoos, soapless shampoos, non-alkaline soap, tooth paste and mouth wash, lipsticks and rouge, Eau de Cologne, face creams, face powder, hair preparations, face lotions, talcum powder.

Extracts and essences: Pure fruit extracts and essences, essential oils, floral concretes and absolutes, Eau de Cologne and perfumery compositions, water soluble perfumes and perfumes for soap, tobacco and snuff, aromatic chemicals.

ARSENIC POWDER HAZARDS

Protection for French Workers

THE protection of French chemical workers against various industrial hazards was the subject of a special decree which has now been enforced.

The decree particularly names the manufacture of chemicals in which workers are exposed to arsenical powders. Where dry processes are used shops must now be completely separated from other sections of the plant and efficient dust-collecting apparatus must be installed. Their efficiency will be inspected from time to time. Crushing and packing of all products containing arsenical powders must be so arranged that dust does not escape.

All walls of these premises must be washable and the floor must slope to aid the evacuation and collection of arsenical compositions. Floors and walls must be cleaned daily with vacuum cleaners. All handling of dry or wet arsenical compositions with unprotected hands is forbidden and no food may be consumed on the premises.

The installation of douches is obligatory and they must be conveniently located to ensure that every worker must make use of them. The usual overalls, buttoning to the neck, goggles to protect the eyes and caps, are, of course, compulsory. The dangers of arsenical poisoning must be printed and posted up so that all workers can read them. There must be regular medical visits and no workers may be employed without having first passed a medical test.

CANADIAN CHEMICALS' NEW RECORD

Last Year's Production Approached $595 Million

CANADA'S chemical and allied industries achieved a new peacetime record in value of production in 1949, having gained 2.6 per cent over the previous peak in 1948. Preliminary figures released by the Dominion Bureau of Statistics show that the year's value amounted to $594.80 million, compared with $579.8 million in 1948. Last year's figures were exceeded only in the two war years 1943 and 1944, when values were attained of $653.5 million and $730.9 million, respectively. Then shell-filling accounted for a large part of the totals.

Ten of the 14 industries in the chemicals group showed substantial gains in output in 1949 as compared with the previous year. Coal tar distillation rose by 17.7 per cent to $9.5 million, polishes and dressings, 15.1 per cent to $11.6 million; primary plastics, 14.4 per cent to $18.8 million; medicinals, 11.1 per cent to $79.68 million; miscellaneous 8.1 per cent to $87.67 million; compressed gases, 4.7 per cent to $11.8 million; fertilisers, 5.9 per cent to $67.7 million; inks, 5.9 per cent to $8.77 million; heavy chemicals, 2.6 per cent to $72.4 million; and paints and varnishes, 1.7 per cent to $82.6 million. Output from the soaps industry declined 4.9 per cent to $64.2 million; adhesives declined 20.1 per cent to $6.9 million; vegetable oils, 12.4 per cent to $55.8 million; and toilet preparations, 1.6 per cent to $16.8 million.

There were 1001 plants in operation in 1949, with 40,506 employees whose salary and wage payments amounted to $95.78 million, compared with 1026 establishments employing 39,548 persons earning $89.3 million in 1948.

Imports of chemicals and allied products rose by 10 per cent in 1949 to $130.6 million; the gains being mainly in drugs and pharmaceuticals, cellulose plastics, fertilisers and in miscellaneous chemicals. Purchases from the U.S.A. were worth $115 million, or 88 per cent of the total value, and from the United Kingdom amounted to $8.4 million, or 6.5 per cent of the total. Imports from France totalled $1.8 million, Switzerland $1.1 million and Germany $1 million.

Chemical exports declined for the third successive year, the value for 1949 being $70.7 million, compared with $79.8 million in 1948 and $83.8 million in 1947. Fertilisers at $39.4 million accounted for 56 per cent of the total exports. Synthetic resins were next in importance at $4.9 million, sodium compounds $4.2 million, medicinals, including penicillin and streptomycin $3.8 million, acids $2.7 million, calcium compounds $1.9 million and pigments and colours $1.2 million.

Limiting Overseas Patent Rights in India

REVISION of the present Indian Patents Act and re-organisation of the Indian Patents Office are among the important recommendations contained in the final report of the Patents Inquiry Committee appointed by the Government of India in October, 1948.

By its terms of reference, this committee, under the chairmanship of Dr. Bakshi Tek Chand, was to survey and report on the working of the patents system in India; to examine the existing patent legislation and to make recommendations for improving it, particularly in respect of preventing abuse of patent rights; and to examine the working of the Patents Office at Calcutta and suggest improvements.

In August, 1949, the committee submitted an interim report on the measures which it considered necessary to prevent the misuse or abuse of patent rights in India, particularly by foreign concerns which had secured patent rights in industries concerned with food and medicine. These firms, it was alleged, were not manufacturing their products in the country and had been using their monopoly rights to guarantee themselves a market in India free from competition and were thus in a position to charge very high prices.

The committee recommended that immediate legislation be passed to amend sections 22, 23 and 23A of the Patents and Designs Act. These recommendations were accepted by the Government of India and an amending Bill was introduced in Parliament during the last session and passed as Act 32, 1950.

After examining the views submitted by nearly 400 persons and associations, and certain oral evidence, the committee has now submitted its final report.

France's Vegetable Oils and Fats

Concerted Measures to Enlarge Colonial Yields

THE handling by France of her share of supplies of vegetable oils and fats in conditions of world shortage has been summarised in a recent review by one of the principal authorities, M. Carriere de Belgarric, director of the Institut de Recherches pour les Huiles et Oléagineux, Paris. The principal general aim is to improve both quality and yields of oleaginous crops in Africa. French territories, other than in Africa, are not apparently included in the plans. Attention is specially concentrated on edible oils and fats, e.g., palm oil and karité fat, so that improved methods of bleaching and refining, as well as expression and extraction, are naturally matters of study.

Fertiliser and Oil Mills

Results to date are summarised under the heads of agriculture, technology, and chemistry. Chief place in the agricultural programme is given to the oil-palm, with which results must necessarily be somewhat slow. Although theoretical yields should be three to five tons of oil per hectare (2.47 acres), actual yields at present average two tons. Collaboration in this work has been arranged with similar organisations in the Belgian Congo and in British Malaya since 1947. Valuable information has been obtained in regard to fertilisers and other cultural factors for the oil-palm and other crops.

In technology, the main result has been the approval by the relevant French Government department of the construction of eight oil mills on selected sites in West Africa with a view to replacing the previous deplorable native methods which yield oils with up to 40 per cent acidity, by the best European methods. One mill is to be on the Ivory Coast, four in Dahomey, one in Togoland, and two in the Cameroons. The likely capacity of each is about 4000 tons of oil, with provision for extension.

Many difficulties have retarded completion of this plan, but the first three—Dibombari (2000 tons), Avrankou (4000 tons), Dabou (4000 tons)—are reported to have had their initial trial runs during the first quarter of 1950. It has been decided to use hydraulic presses in the districts where pulp formation in the fruit is adequate, and centrifuges in drier districts where thickness of pericarp is less. The acidity of the palm oil produced at Dabou is down to 4 per cent, and at Drewin, a small experimental plant of 500 tons, 2 per cent.

Special attempts are being made in the Paris laboratories to improve the Velghe type of mixer-washer for oil expression in conjunction with the Pobé station. These include special steam injection, which loosens 60 per cent of the pulp oil, and a further 35 per cent may then be recovered by washing with hot water. It is claimed that the latter is much more easily decanted than by the ordinary Velghe system, and it is hoped by this method eventually to exceed a 90 per cent oil recovery. The method, which is the subject of a recent patent application, is expected to eliminate the need for the most costly part of an oil mill plant.

Linseed Oil Programme

FRANCE'S attempts since the war to obtain adequate supplies of linseed oil at economic prices, as well as oilcake required by her farmers and stock-breeders, appear to have been fraught with difficulties comparable to those of Great Britain and other countries in the same field.

Her mission to the Argentine, headed by M. Pierre Lebon, president of the French linseed oil pool, was unable to accept the onerous conditions and high prices required by the Argentine government. (It is interesting to note in this connection that Britain is obtaining from the Argentine 80,000 tons of linseed oil at £108 for July delivery, also 150,000 tons of oilcake).

Attempts were made to see what could be done in the French overseas territories, states *Oléagineux* (1950, *5* (6) 354-8). It was preferred, of course, to obtain the seed and not oil, as there is plenty of oil-milling capacity in France not too fully occupied. Some progress has been made in Morocco, where the 1949 harvest yielded only 100,000 tons of seed—instead of the 150,000 tons expected—owing to floods in May and June last year. So far, in 30 months up to December, 1949, some 110,000 tons of seed have been supplied from that source with oil content 10 per cent better than that of Argentine linseed.

From experimental plots in Madagascar cultivation has developed on a fairly large scale in five areas by the use of the most modern mechanised methods.

THE CHANGING S. AMERICAN MARKET

Chemical Production and Research in Brazil

SOME idea of the progress of the Brazilian chemical industry can be gathered from the number of petitions presented at the end of June to register, as "national similars," products which have hitherto been classified as essential imports. In accordance with the law, registration is conditional upon proof that the articles in question are produced in satisfactory conditions as regards quantity, quality and price. Once they have been so registered, public service corporations and others, entitled to exemption from payment of customs duties on material imported for their services, may no longer import these articles without paying full customs charges, and all applications from any source to import such articles are refused under the present system.

Among the many products submitted for registration at the last June meeting of the "Commission for National Similars" were the following: "Penicilina G"—procaine or benzilpenicilinato of procaine; chlorate of calcium; dynamite, special dynamite, gelatine, special gelatine and blasting gelatine, produced by the Duperial Company; hexiclan, based on hexachlorate of benzene; synthetic glues prepared by the Goodyear Company, and phosphates derived from apatites.

* * *

At the end of June, the Department of Mineral Production announced that the experiments to extract sulphur directly from pyritic rejects of national coal have been entirely successful. The official statement points out that the discovery is of particular importance to Brazil, since there are no known deposits of sulphur in the country, and the chief obstacle to the complete utilisation of national coal has been the presence of sulphide of iron. Mechanical processes of treating the rejects have yielded a relatively pure concentrate, containing from 43 to 49 per cent of sulphur with less than 5 per cent of carbon.

This concentrate could be used by the sulphuric acid factories, but lack of transport facilities from the mines would render the cost prohibitive in consuming centres. The Department of Mineral Production has been assisted by Dr. Paul Kubelka, late Professor of Prague University, in the experiments, and the process is now to be patented. The next step will be to obtain Government credits for further research, so that the method can be applied economically for industrial use. By this method the south Brazilian mines, even with the present low output of two million tons annually, should yield 50,000 tons of sulphur, and the refuse will be sold at good prices.

* * *

Two companies, founded in 1949, the Orquima in San Paulo, and Oximetal in Niteroi, State of Rio de Janeiro, are now treating monazite sands chemically, producing chlorite and sulphate of cerium, which is being exported to Europe. Monazite has hitherto been shipped in the natural state, and since 1942, in accordance with the Washington Agreements, has been shipped exclusively to the U.S.A. The price per ton was fixed at $200 in 1949 and at $250 this year. Now, the primary salts produced in Brazil yield $1200, while the residue of thorium remains in the country, and the phosphorus, recovered in the form of sodium phosphate, is being transformed into products which, until recently, had to be imported. Experiments are being carried out this year to produce metallic cerium for metallurgy.

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A third enterprise, the Fomil, a subsidiary of the Lindsay Light & Chemical Company, of Chicago, has acquired the monazite deposits of the Atlantica, an off-shoot of E. I. Du Pont de Nemours, which, during the war and until 1947, prospected the more important beds on the coast of Rio de Janeiro, Espirito Santo and Bahia. The reserves here are estimated at 3.5 million tons, comprising 2 million tons of ilmenite, 600,000 tons of zirconite, and 150,000 tons of monazite. Fomil has submitted a project to the Government, undertaking to industrialise rare earths on condition that Brazil prohibits exports of monazite in the natural state. This enters the U.S.A. free of duties, whereas the derived salts pay 35 per cent *ad valorem*.

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The Companhia de Anilinas, Produtos Quimicos e Material Tecnico, which was founded in 1946, enlarged its installations at Rio de Janeiro in 1949 and is now opening a branch at Belo Horizonte, in Minas Geraes. It had a profit equivalent to £49,768 in 1949.

NEW PROJECTS IN CEYLON

Plant and Technology from Britain

MAJOR L. H. MANDERSTAM, of the London chemical engineering consultant firm of L. H. Manderstam & Partners, Ltd., is at present in Colombo for talks with the Ceylon Government in connection with the implementation of the industrial programme in its six-year plan. He is accompanied by Dr. Hugo Schaefer, who is internationally known as an expert in the manufacture of nitrogen-containing fertilisers. Mr. P. H. Wilson, a senior partner in the Manderstam company, expects shortly to leave for Ceylon to join the expert mission.

Detailed plans are to be discussed for the establishment of three major industrial projects in Ceylon. One is for the production of low alcohol, for which the plant is expected to cost, when completed, in the region of £1 million. The equipment is being supplied by the United Kingdom, the U.S.A. and Switzerland. The plant, which it is expected will be in full production by early 1952, is to have a capacity of some 300 tons, low alcohol every 24 hours.

Another project is connected with the development of the caustic soda industry. This is expected to entail a total expenditure of about £750,000. The mission is also to advise on the establishment of a factory for the production of nitrogen fertiliser, for which all the necessary raw materials are available in Ceylon.

Major Manderstam has planned also to go to Karachi for consultations with the Government of Pakistan on its chemical industry.

Indian Fertiliser Replacement

AS a result of studies carried out by the Indian Institute of Sugar Technology during the last few years, at Kanpur, a manure claimed to be of very good nutritional value has been produced experimentally. It is made from the waste products of cane sugar factories by mixing press mud and cane trash in the ratio of 1:3, and then decomposing for a few months. It is said that this gives a product containing over 1.5 per cent of available nitrogen, in addition to large proportions of potash and phosphates. The cost of production is estimated to be as low as A2 per lb. of nitrogen. The sugar factories of the Union of India produce about 9.4 million maunds of press mud annually, which is expected to give 12 million maunds of compost.

SIX MONTHS' STEEL RECORD

Rate of 16·2 m. Tons in June

A NEW record for a six-monthly period of production was established by the steel industry in the first half of this year when a total of 8,309,000 tons of steel was produced. This was an increase of 351,000 tons over the previous six-monthly record which was set up in 1949.

Output in June was also a record for the month, being at an annual rate of 16.249 million tons compared with the previous best of 15.645 million tons in the same month last year.

Pig-iron in June also showed an increase to an annual rate of 9.474 million tons against 9.664 million tons in June, 1949.

Output comparisons issued by the British Iron and Steel Federation are as follows:

STEEL INGOTS AND CASTINGS
(Thousands of tons)

	1950		1949	
	Weekly average	Annual rate	Weekly average	Annual rate
May...	319.2	16,597	315.6	16,409
June	312.5	16,249	300.9	15,645
First Half year ...	319.6	15,619	305.7	15,897

Young Research Laboratory Opened

THE new Young Laboratory at the Royal Technical College, Glasgow, was formally opened last week by Sir William Fraser, chairman of the Anglo-Iranian Oil Co., Ltd., and a former student of the college. Built in the new extension to the college, the laboratory was given added interest by a display of personal records, notebooks and papers belonging to Dr. James Young, patent holder of the refining process on which much of the ultimate oil refining practice developed. The new laboratory will be used for a number of advanced research projects and incorporates some of the most modern equipment. Its work will include silicosis and dust research, infra-red work, high vacuum technology and mass transfer work.

In some cases the equipment has been completed to the college's own designs and research needs. The pyrolysis section has a vapour phase reactor unit in use while in the infra red spectrometry laboratory there are installed a photoelectric colorimeter and monomolecular film balance. The mass transfer laboratory has a unit which is the gift of the Anglo-Iranian Oil Co., Ltd. In this section there is a rotary gas washer. The dust investigation laboratory has a photoelectric dust sedimentation apparatus made in the college workshop among its equipment.

Technical Publications

DETECTION of carbon monoxide is the subject of Leaflet No. 7, originally published by HMSO in 1939 and now brought up to date (June, 1950). A new method involving the use of potassium palladosulphite impregnated on silica gel—which was developed during the war—has been added. This method is substantially the same as that previously described in THE CHEMICAL AGE (*60*, 863).

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PRACTICAL application of high strength cast iron is the subject of the leading article in "The Nickel Bulletin" (Vol. 23, No.5) now available from the Mond Nickel Co., Ltd., London. How the severe service conditions required for operation of a new automatic loom for the textile industry have been met by the use of acicular cast iron is described. Problems of industrial finishing dealing with electropolishing, enamelling and nickel plating are included in the usual wide selection of abstracts.

* * *

AIR compressors and heaters, alkalis, detergents, dust collecting, fume control and recovery plant, water softeners, laboratory equipment and all types of laundry requisites as well as chemicals and dyes are included in the comprehensive survey of the ninth edition of the Laundries and Laundry Requisites Directory, 1950 (5s). published by the Anglo-Scottish Press, Ltd., London. The work contains information about new plant, equipment and supplies of all kinds.

* * *

FURTHER aspects of the therapeutic value of quinine salts are treated in the current publication of the London Cinchona Bureau, "Relief of Night Cramps by Quinine." This deals with the use of quinine from the clinical standpoint.

* * *

PURIFICATION of kaolin by electro-osmotic methods is the subject of a long review by S. R. Arras in the May issue of *ION*. Industrial applications beginning with pioneer work of Count von Schwerin and the erection of works in Europe and the U.S.A. are described. Electro-dehydration, the electro-osmotic filter press and electrophoresis apparatus are considered. There are about 100 references, but these are mostly prior to 1925.

METAL statistics are the subject of three new publications, two from the U.S.A. and one from France. Metal Statistics, 1950, is the 43rd annual edition published by the American Metal Market, containing information on ferrous and non-ferrous metals and miscellaneous economic subjects. There is a useful directory of products and their manufacturers. A similar publication, the 29th Year Book of the American Bureau of Metal Statistics, gives an international survey of the production and economics of the principal metals, other than iron and steel, up to and including 1949. Statistiques, published by Minerals et Métaux S.A., Paris, covers the production and consumption of non-ferrous metals since 1939. The main mineral deposits and refineries are indicated in coloured maps, and London commodity quotations from 1913-1949 are given at the end of the volume.

* * *

SODA ash is the subject of an article in the current issue of the "I.C.I. Magazine" in which A. E. J. Gawler describes the development of the great industrial project that has grown up at Lake Magadi, Nairobi, recovering sodium materials from the lake and processing it to the carbonate. The properties, characteristics and varied applications of the new laminated plastic building material are also described and illustrated.

Vapour Pressure Measurement

A NEW precision mechanical instrument for the continuous measurement of low gas and vapour pressures has recently been introduced by W. Edwards & Co. (London), Ltd.

This barometrically compensated capsule dial gauge (Model CG1) is supplied at various pressure ranges from 0-760 mm. Hg. and is accurate within $\pm 2\frac{1}{2}$ per cent of full scale deflection. It has the advantage of being unaffected by barometric changes and has no manometric or sealing liquids or mercury hazards.

Another type of gauge of which production is being begun by this company is the Pirani-type instrument. This is a hot wire type, operating from a battery or the mains with full leak detection facilities. The range of the instrument is 0.5-0.001 mm. Hg., and, of simplified design, it makes precise high vacuum measurement available in many fields from which it was excluded by the cost factor.

The Chemist's Bookshelf

PROGRESS IN CHROMATOGRAPHY 1938-1947. L. Zechmeister. 1950. London: Chapman and Hall, Ltd. Pp. 368. 45s.

Chromatography is rapidly invading many of the fields of chemistry and its literature is becoming bewilderingly extensive. Experimental facts have been accumulating far faster than they can be absorbed into a systematic structure, and new work on the subject is often very largely of a hit-or-miss nature. The need for periodical surveys is thus imperative, as was demonstrated in the Faraday Society's general discussion last September.

This volume is intended to bring up-to-date (to 1947) Zechmeister and Cholnoky's standard treatise. The English translation of the original work which appeared in 1941 is now being reprinted, and this detailed progress report is presented in lieu of a re-editing of the original monograph as likely to be of greater assistance to those interested. It is thus a supplement, but the field has been covered so well that the volume can be regarded as a reasonably self-contained reference work on chromatography. Unfortunately, this otherwise excellent review suffers from the fact that the author has not been able to cover the work of the last three years during which many significant advances have been made, *e.g.*, in the use of paper strips and cellulose columns, in ion exchangers, in inorganic chromatography, in chromatographic theory, etc.

Principles and methods, together with descriptions of newer techniques such as partition chromatography, paper chromatography, Tiselius-Claesson boundary methods, and exchange chromatography, are discussed in the introductory general section (57 pages). The main section (226 pages) is devoted to specific consideration of chlorophyll, porphyrins, bile pigments, synthetic dyestuffs, amino acids, hydrocarbons, alkaloids, vitamins, and many other classes of substances. A final chapter deals with inorganic chromatography.

The information given is almost encyclopaedic, and includes numerous space-saving tables. Concise descriptions of the methods used by various workers and very complete data about adsorption, elution, etc. behaviour are given, with all necessary references to the bibliography (40 pages). There are also comprehensive name and subject indexes.

As the possibilities of chromatography in effecting difficult separations, in identifying trace components, in revealing structure and in general qualitative and quantitative analysis become more widely known its techniques are tending to replace classical methods.—G.S.

POCKET ENCYCLOPÆDIA OF ATOMIC ENERGY. F. Gaynor, 1950, New York. The Philosophical Library Inc. Pp. 204. $7.50.

This book contains a collection of brief notes on the concepts and terms used in the field of nuclear physics, and is claimed to be a comprehensive handbook for all interested in the subject, from the research worker to the "intelligent layman."

The scope is broad. Topics only remotely connected with the subject are included, the idea being, perhaps, to assist the "intelligent layman," rather than the research worker. The inclusion of the simpler physics fundamentals, such as vector quantity, millibar and convection, for instance, shows the author has tried to incorporate most data that might possibly be needed, especially when dealing with the position of nuclear physics in relation to the other sciences. It is arguable, however, that for a pocket encyclopædia a number of such definitions could well have been excluded, if only to reduce the not inconsiderable cost of such a volume. But there is much to be commended within the covers. Mr. Gaynor has treated the statistical aspect with great thoroughness, indicated, for example, by the inclusion of tables of isotopes, packing fractions, orbital electrons and nuclear neutron excess. The definitions and explanations, too, are clear and concise, without ambiguity or tedium, and appear to be up to date.

It can be said that, with the reservations mentioned, this book is a valuable addition to the chemist's reference library, and for some students it may be indispensable, despite the price.—P.M.

HOME

Record Imports in June

Trading figures for June announced last Tuesday, showed that imports were provisionally valued at £238.6 million. Exports totalled £175.9 million in a month of only 25 working days. Adjusted to a standard month of 26 working days the figure would be 182.9 million or slightly higher than the May export total.

Scottish Oil Shale Industry

The prospect of a new and expanding oil shale industry in Lanarkshire, located to the west of the present area being worked for shale, which might serve in the future to offset the diminishing coal production, was held out by Dr. John B. Simpson, of the Geological Survey of Great Britain, speaking last week at the second Oil Shale and Cannel Coal Conference in Glasgow.

Record Cement Production

The cement industry surpassed all records in May with an output of 764,000 tons. This was equivalent to a weekly average of 191,000 tons, of 3000 tons a week more than the previous best set up in April, which was a five-week month. Despite this production, heavy demand reduced stocks at the end of May to 189,000 tons—the lowest level since last November.

Working Party on Weedkillers and Insecticides

The likelihood of legislative action directed to limit the possiblities of human injury in the course of use of insecticides and weedkillers is foreseen in the announcement that the Ministry of Agriculture is to set up a working party to review the entire subject. Official concern was sharpened by the recent deaths of two agricultural spraying operatives after prolonged contamination with a dinitro-ortho-cresol preparation.

Fuel Efficiency Exhibition

The Minister of Fuel, Mr. Philip Noel-Baker, is expected to open the "Fuel Efficiency in Industry and Home" exhibition to be held at the City Hall, Manchester, from November 22 to December 2. Organised by the National Smoke Abatement Society, the exhibition will focus attention on plant and appliances that promote the better and more economical use of fuel of every kind, and is being planned to give full prominence to both the industrial and the domestic aspects. There will also be organised visits, lectures, and film displays.

Sulphate Turpentine Restrictions Removed

The Board of Trade announces that the restrictions on the sale and use of sulphate turpentine have now been removed. Conditions applying to sales of other types of turpentine for use in the manufacture of paints and polishes and for retail sale are unchanged.

Coal Production

The Scottish miners' strike and the commencement of the summer holidays are blamed for the reduction in coal output in Britain last week. Total production of deep-mined coal was 3,736,400 tons, compared with 4,037,000 tons the previous week and 3,756,200 tons in the corresponding week last year.

A New Degreaser for Aluminium

A new aluminium degreaser, claimed to be more efficient than those at present in use, is shortly to be marketed by Jenolite, Ltd. The degreaser is said to be non-inflammable and does not attack rubber, and it will not injure even polished aluminium surfaces. It is expected that the degreaser will find wide use in the aircraft and magnesium alloy industries.

Export Licences

The Board of Trade announces changes in export licensing control, taking effect from July 8. Fertilisers exported to the Channel Islands, and nicotine and its salts and preparations to other destinations, are no longer subject to licence. Open licences are available for the export of goods wholly or mainly of aluminium, copper, iron or steel, provided that the declared value per ton exceeds the value of the actual metal content by the following amounts: iron or steel, £16 16s. per ton; aluminium, £150 per ton; copper, £200 per ton; copper alloy, £160 per ton.

World Power Conference

The fourth World Power conference was held in London this week, when some 16,700 delegates from 47 countries assembled under the chairmanship of Sir Harold Hartley. The programme included 156 papers for the technical sessions when discussion included the preparation of solid, liquid and gaseous fuels, water and steam power, internal combustion engines, gas turbines and atomic energy. A message from Princess Elizabeth was read, in which Her Royal Highness referred to new means of utilising nature's stores of energy and to the value of the conference in acting as a pool of knowledge.

· PERSONAL ·

MR. R. MATHER (Skinningrove Iron Co., Ltd.) has succeeded SIR ANDREW MCCANCE (Colvilles, Ltd.) as chairman of the British Iron and Steel Research Association. The latter becomes president in succession to MR. G. H. LATHAM (Whitehead Iron & Steel Co., Ltd.), who has held the office for the last three years. MR. J. MITCHELL (Stewarts & Lloyds, Ltd.) has been elected a new vice-president and PROF. J. H. ANDREW (University of Sheffield) and MR. F. H. SANITER (United Steel Companies, Ltd.) have been co-opted to the council.

A striking tribute to Birmingham University was paid by PROFESSOR M. L. E. OLIPHANT prior to his departure last Monday for Australia. It was destined for very great things, he said, and might easily become the premier university in the country, at any rate in the field of science. They were, for example, just building the world's most powerful equipment for the study of nuclear physics. For some considerable period Birmingham might, therefore, become the pioneer centre of that kind of work.

The following officers have been appointed by the British Non-Ferrous Metals Federation for 1950-51. President and chairman of the executive committee, MR. WILLIAM H. HENMAN (past president is MR. HORACE W. CLARKE); vice-presidents, MR. W. J. TERRY and MR. H. E. JACKSON; treasurer, MR. A. L. JOHNSON. (*Mr. Henman's presidential review of non-ferrous metal affairs is published on page* 80.)

DR. WILLIAM H. WATSON, assistant director of the atomic energy project at Chalk River, an authority on radar, has been appointed head of the physics department at the University of Toronto. He succeeds PROFESSOR E. C. BULLARD, who returned to England early this year.

MR. A. GEOFFREY COLLINGS, London industrial chemist, has been selected by Pudsey Division Labour Party as their prospective candidate at the next General Election. Mr. Collings was beaten by the Conservative candidate by 64 votes at the last election.

MR. PETER REID, of Euxton Hall, Chorley, a former director of the Bleachers' Association, left £380,986, net £375,867.

DR. WALTER MEITNER, manager of Fashion Printers, has been elected a fellow of the Textile Institute. For many years he has been engaged in research and practical work on textile processing, having contributed substantially to the theory of dyeing. Also elected to membership of the institute are two new associates: MR. J. W. DRIVER, assistant to weaving manager, Carr Manufacturing Co., and MR. R. W. ROBERTSON, works chemist, Nith Dyeing & Finishing Co., Dumfries.

MR. R. J. PINDER, assistant general sales manager of Anglo-American Oil Co., Ltd., since 1945, has been appointed deputy general sales manager. MR. G. W. POWELL, who since 1939 has been divisional manager of the south western division, with headquarters at Bristol, has come to London as assistant general sales manager.

MR. ARTHUR C. HOWDEN has just retired from Hunt Bros. (Castleford), Ltd., chemical manufacturers, after 56 years' unbroken service. He rose to be sales manager, having started in 1894 as an office boy at 4s. a week.

Students in Industry

AN industrial training scheme, believed to be the only one of its type working in this country, is again to be used by the Royal Technical College, Glasgow, this year to give final year students an insight of industry's methods and objectives. Students who have shown ability will spend a fortnight with leading industrial firms. A further development made possible by the collaboration of I.C.I., Ltd., will permit all final year students to receive a six-week or seven-week "Clinical experience," similar to that employed by the Massachusetts Institute of Technology.

The Ardeer factory of I.C.I., Ltd., has been made available by the directors and Dr. J. W. M'David, research director of I.C.I., Ltd., will supervise the experiment, both as an I.C.I. executive and as a governor of the college. Besides giving students valuable practical experience of industry, the innovation will help to develop still further the liaison between the college and industry, which has been advocated and encouraged during the past few years.

· OVERSEAS ·

Duralumin Production in Jugoslavia

The aluminium plant at Lozovac, Jugoslavia, is reported to have commenced production of an alloy of the duralumin type.

Industrial Acids for Morocco

Reports from Morocco state that the Sté. Chérifienne d'Engrais et de Produits Chimiques is now able to supply all the acids needed in local industry and that superphosphate production is also almost sufficient to meet the country's needs. Sulphuric acid production now amounts to 110 tons daily.

New Source of Paper Pulp

The Indian Forest Research Institute at Dehra Dun states that investigations of the possibility of using palmyra stems for pulp and paper manufacture show that palmyra pulp is a satisfactory ingredient for medium grades of writing and printing paper. The pulp yield is low but this disadvantage may be offset by the low cost of the material.

Soviet Countries Boycott Achema

It is expected that 5000 visitors will visit the Achema 9 exhibition before it closes on July 16. Applications from countries abroad totalled 22 per cent of those from Germany. While visitors from many European countries, India and the U.S.A. will be numerous, Jugoslavia is the only country of the Balkan group to disregard the U.S.S.R. boycott.

Chemicals in the Saar

The government of the Saar has been informed by French authorities that it will be left free to develop a chemical industry using coal and coal by-products. It is understood that the Saar hopes to produce 50,000 tons of synthetic fuel, particularly motor fuel and oil for diesel engines, for which a plant is planned at Sulzbachtal. It will cost the equivalent of £1.5 million and require two years to instal.

International Control of Narcotics

International discussion of the growth of illicit traffic in narcotic drugs and methods of control are to take place in Geneva next month. Representatives of the principal opium-producing countries—India, Iran, Jugoslavia, Russia and Turkey have been invited, as well as the principal drug-manufacturing countries which are members of the United Nations Narcotic Drugs Commission. The intention is to replace the present complex series of international agreements on the control of narcotics by one comprehensive convention.

Holland Ends Control of Chemicals

Control of chemical products, including bandages, has been terminated, with effect from May 31, by the liquidation of the Rijksbureau voor Chemische Producten. Bones represent one of the few items still controlled by legislation in Holland.

Mexican Oil Exports

Continued increases in Mexico's oil output made it possible for the Government-owned Petroleos Mexicanos to export five million barrels of oil, valued at $6.5 million, in the first quarter of this year. These exports were considerably higher than those of recent years.

Oil and Copra Exports Resumed

The Government of Ceylon has revoked its ban on the export of coconut products. All such products, other than fresh coconuts, may now be exported without licence. The export of fresh coconuts will continue to be governed by the existing licensing procedure. An export duty of Rs.300 per ton on copra is retained.

U.S. Research Generator

The installation of a 2 million-volt Van de Graaff generator is reported by the Brookhaven Laboratory, New York. The generator will probably be used to study the effect of electron radiation on aqueous solutions of simple compounds, such as iodides and hydrogen peroxide, with a view to discovering more about the nature of molecular disintegration.

New Swedish Pig-Iron Process

The Bergslaget Research Institute at Domnarvet, Sweden, is reported to have developed a new process for the elimination of sulphur from pig-iron. The pig-iron is put into a furnace revolving at great speed and is purged of sulphur by the addition of powdered limestone mixed with coke. It is stated that the sulphur content is reduced from 0.1 per cent within 10 minutes.

Magnesium Oxide in Norway

A subsidiary of Norske Hydro, the H.E.F.A., has announced its intention to start the production of magnesium oxide next summer. The initial annual capacity is expected to be about 9000 tons, possibly increasing to 18,000 tons later. The raw materials to be used are sea water and chalk, or dolomite. Dolomite, which is widespread in Norway, has been found to be superior to chalk powder for precipitating magnesium hydroxide from sea water in this type of process.

The Stock and Chemical Markets

APART from a further modest rally in British Funds, markets have remained quiet, under the influence of the Korean hostilities, and there has been very little business in most sections. The rising trend in commodity and metal prices has reacted only slightly on share prices. Tin has advanced by nearly £40 per ton during the past fortnight, but company shares have hardly responded. Rubber shares have remained extremely quiet now that part of last week's rise in commodity price has been lost, the present price is 2s. 4d. per lb., indicative of the reception of the U.S. decision to increase production of synthetic rubber.

Chemical shares have again shown movements of only a few pence. Imperial Chemical, at 40s. 4½d., lost part of an earlier small improvement, and Albright & Wilson, at 28s. 6d., were hardly affected by City reports that the company may be planning before long to make an issue of £1 million, either in preference shares or debentures in which shareholders would, no doubt, have preferential terms of allotment. Nevertheless, it is realised that decisions to make new issues during the next few weeks will depend on general market trends. The market is also assuming that Lever & Unilever may require as much as £15 million more capital this year, partly because of rising costs, and larger stocks to be financed because of the forthcoming lifting of soap rationing. Lever & Unilever, at 40s., were lower, with Lever N.V. at 39s. 6d. Brotherton 10s. shares continued to hold their rise to 20s.; Amber Chemical 2s. shares were 3s. 3d.; F. W. Berk 2s. 6d. shares, 15s. 6d.; and Boake Roberts 5s., shares 26s. Monsanto are firm at 49s. 6d., with Fisons little changed at 25s. 9d.; Bowman Chemical 4s. shares, 5s. 3d.; Pest Control 5s. shares, 7s. 6d.; L. B. Holliday 4½ per cent preference 19s. 6d.; British Chemical & Biologicals 4 per cent preference 5s. 3d.; Sanitas Trust 10s. shares were quoted at 15s. 9d.

Borax Consolidated deferred held at 55s., British Glues 4s. shares kept firm at 21s. 9d., and fair business was reported around 47s. in Glaxo Laboratories, while expectations of good results kept the 4s. units of the Distillers Co. steady around 18s. The latter yield little more than 4 per cent, on the basis of last year's dividend, but it is assumed that, in due course, there will be a more liberal dividend policy and that, because of the company's diverse and progressive interests, profits during the next few years probably have scope for further good expansion.

Iron and steels were helped by oversubscription of the John Summers debenture issue and by the premium of up to 30s. established in initial dealings. There is the likelihood that other big steel companies may also make issues of debentures at slightly under par, with the right of redemption at par in the event of nationalisation. It is pointed out that this is cheaper than relying on bank loans to finance expansion and development plans.

United Molasses at 41s. 10½d. were little changed, Turner & Newall at 81s. 9d., and United Glass Bottle kept firm at 75s., although Triplex Glass, at 22s., were inclined to ease. Beechams deferred at 13s. lost the rise which followed the announcement that the dividend on these 1s. shares is being restored to 40s per cent. Oils were uncertain, with Anglo-Iranian lower at £6¼, and Shell at 63s. 1½d.

Market Reports

HOME trade on the industrial chemicals market has been well maintained and delivery specifications are well up to schedule. The volume of inquiry for export has also been good. Most items in the soda products section are being taken up in good quantities and the potash chemicals remain in steady call at firm rates. British Industrial Solvents, Ltd., have announced that as from July 1 the price of butyl acetate has been reduced by £5 per ton. Carbon tetrachloride is now quoted at £59 10s. per ton—an increase of £2 per ton. Fairly steady trading conditions continue to prevail on the coal tar products market. A good call is reported for the light distillates and pitch is receiving a fair amount of attention both on home and export account. The basic price of phenol is now 1s. per lb.

MANCHESTER.—Deliveries of heavy chemical products to the textile bleaching, dyeing and finishing trades have been adversely affected during the past week by stoppages for annual holidays in a number of Lancashire towns. For the same reason, consumption has also been reduced in other directions. Apart from this purely seasonal influence, trade is proceeding on steady lines. A fair amount of fresh inquiry has been reported for alkalis and other bread-and-butter lines during the

(*continued at foot of next page*)

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

LANKRO CHEMICALS, LTD., Eccles. (M., 5/7/50.) June 13, mortgage and charge, to Midland Bank, Ltd., securing all moneys due or to become due to the bank; charged on Bentcliffe Works, Salters Lane, Eccles, and offices, laboratories, machinery, fixtures, etc.; also a general charge. *£25,527. August 24, 1949.

Satisfactions

ANGLO-BURMA TIN CO., LTD., London, E.C. (M.S., 15/7/50.) Satisfaction June 14, of debenture stock registered November 15, 1946, to the extent of £20,000.

COAL & SILICA INDUSTRIES, LTD. (formerly FOLLSAIN SYNDICATE (FRANCE), LTD., London, E.C. (M.S., 15/7/50.) Satisfaction June 16, of debenture registered June 4, 1942.

Increase of Capital

The following increase in capital has been announced:—DALMAS, LTD., from £75,000 to £150,000.

New Registrations

Activated Carbons & Chemicals, Ltd.
Private company. (27,786.) Capital £5000. Chemical manufacturers, millers, grinders, etc. Directors: J. S. Young, and Mrs. E. B. Young. Reg. office: 257 Eglinton Street, Glasgow.

Associated Descalers, Ltd.
Private company. (484,004.) Capital £2000. Chemical and mechanical descalers, cleaners and repairers of boilers, furnaces, tubes, etc. Subscribers: S. E. Harrison, F. Aldred, T. H. Piper, and G. R. Wyatt. Reg. office: Mill Lane, Longcauseway, Farnworth, Lancs.

C. F. Charles & Company, Ltd.
Private company. (484,036.) Capital £1000. Chemical manufacturers. Directors: C. J. H. Haynes, K. M. Haynes. Reg. office: 670 High Road, Tottenham, N.17.

E. M. Jacob & Co., Ltd.
Private company. (483,853). Capital £10,000. Manufacturers and producers of metals and metallic substances, ores, residues, scrap and the products, chemicals, fertilisers, etc. Subscribers: Ernest M. Jacob and Julius Loewinstein. Reg. office: 79 Bishopsgate, E.C.2.

Lloyd's Soapless Detergents, Ltd.
Private company. (484,140.) Capital £100. Manufacturers of soaps, soap and bleaching powders, washing materials, etc. Directors: L. Pugh, D. G. R. Freeman. Reg. office: Station Road, Tenterden, Kent.

Company News

Lewis Berger & Sons, Ltd.
Group accounts of Lewis Berger & Sons, Ltd., show a decline in trading profits for the year ended March 31 of £74,055 to £801,450. The total ordinary dividend is being maintained at 33 per cent with a final payment of 25 per cent. Total sales values by the main operating companies were again substantially higher, although there were reductions in selling prices. There has been another substantial increase in the volume of trading during the early months of this year.

Changed Name

The name of Celands (Export), Ltd., has been changed to C. & R. Landsman, Ltd.

THE STOCK AND CHEMICAL MARKETS

(continued from previous page)

past few days. Fertiliser materials have been in moderate request, taking the market as a whole, and a fair trade has been done in tar products.

GLASGOW.—Business in general in the heavy chemical markets remains consistently steady apart from a slight falling off in some of the larger requirements of chemicals owing to stocktaking and balance periods at June 30. Export business has been exceptionally good for a week.

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2. at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Compositions containing silicon esters or polymers thereof.—W. E. Smith, C. Langrish-Shaw, and H. G. Emblem. Feb. 26 1948. 641,553.

Process for preparing a stable aqueous emulsion of polymerised normally liquid water-insoluble polymerisable compounds and the stable aqueous emulsion resulting from said process.—Shawinigan Resins Corporation. May 2 1947. 641,653.

Preparation of plasticisable elastomeric compositions.—American Cyanamid Co. May 16 1947. 641,600.

Electrolyser, in particular for producing oxygen compounds of chlorine.—Krebs & Co. Akt.-Ges. May 24 1947. 641,556.

Manufacture of an imidazoline.—Ciba, Ltd. July 11 1947. 641,605.

Method for making phenol.—Socony-Vacuum Oil Co., Inc. July 25 1947. 641,662.

Production of alkali cellulose.—American Viscose Corporation. Sept. 3 1947. 641,609.

Separation of iron and titanium compounds from ores containing iron and titanium.—Titan Co. Aktieselskabet. Nov. 13 1947. 641,738.

4-acylamino-1, 8-naphthalimides and their preparation.—General Aniline & Film Corporation. Dec. 11 1947. 641,569.

Manufacture of $\Delta^{20:23}$-21-halogen-choladienes.—Ciba, Ltd. Dec. 12 1947. 641,617.

Manufacture of pregnane derivatives substituted in the 21-position.—Ciba, Ltd. Dec. 13 1947. 641,618.

Manufacture of basic esters.—Wander Akt.-Ges., A. Dec. 15 1947. 641,571.

Manufacture of esters of a, α-diphenyl-propionic acids.—Wander Akt.-Ges., A. Dec. 19 1947. 641,573.

Copolymerisation of ethylene and vinyl chloride.—E. I. Du Pont de Nemours & Co. Jan. 2 1948. 641,679.

Process for producing urea-formaldehyde resins.—Beck, Koller & Co. (England), Ltd. Feb. 12 1948. 641,697.

Manufacture of unpolymerised urea-formaldehyde reaction products.—E. I. Du Pont de Nemours & Co. March 5 1948. 641,703.

Recovery of chlorobenzene—United States Rubber Co. May 14 1948. 641,520.

Desulphurisation of steel.—Mond Nickel Co., Ltd., and W. W. Braidwood. May 19 1949. 641,523.

Froth flotation processes and frothing agents.—National Chemical Products, Ltd., and R. F. Powell. Nov. 14 1945. 641,932.

Production of potassium bitartrate.—Permutit Co., Ltd. Aug. 1 1946. 641,786.

Alkylated thiophene compounds and production thereof.—Texaco Development Corporation. March 3 1947. 641,944.

Production of feed gases for the synthesis of hydrocarbons.—J. C. Arnold (Standard Oil Development Co.). March 17 1947. 641,945.

Nitriles and process of making same.—Sun Chemical Corporation. May 21 1947. 641,955.

Process of producing alkali and alkaline earth metals.—G. & W. H. Corson, Inc. May 23 1947. 642,034.

Process for the production of metal oxides.—Saurefabrik Schweizerhall. June 2 1947. 641,801.

Electrolysers having soluble anodes—H. Lawarree. June 24 1947. 641,960.

Viscosimeters.—K-C-M Co. July 17 1947. 641,966.

Process for burning lime.—Standard Oil Development Co. July 22 1947. 642,036.

Method of removing iron from ceramic raw materials.—American Optical Co. Aug. 6 1947. 641,971.

Detergent compositions.—Deodor-X Co. of England, Ltd., P. J. Hooper and R. A. Chandler. Aug. 20 1948. 641,902.

Production of artificial articles from polymerisable material.—Imperial Chemical Industries, Ltd., and T. E. Atkinson. Sept. 1 1948. 641,903.

Apparatus for determining the constituent proportions of a gaseous mixture.—Manufactures de Produits Chimiques du Nord Etablissements Kuhlmann. Sept. 4 1947. 641,978.

Method of purifying liquids.—Naamlooze Vennootschap Algemeene Norit Maatschappij. Dec. 30 1947. 641,992.

Mixed phthalate esters and compositions incorporating them.—Nopco Chemical Co. Jan. 1 1948. 642,039.

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Plastic organic polymer compositions.—Petrocarbon, Ltd., H. Steiner, H. S. Boyd-Barrett, and J. R. Holker. Jan. 27 1949. 641,832.

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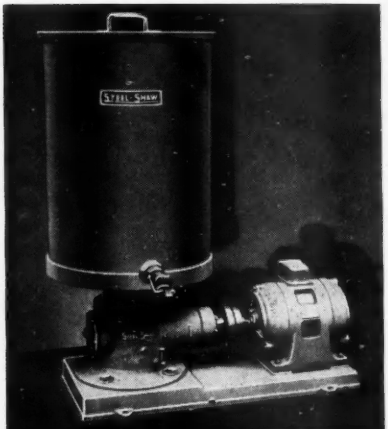

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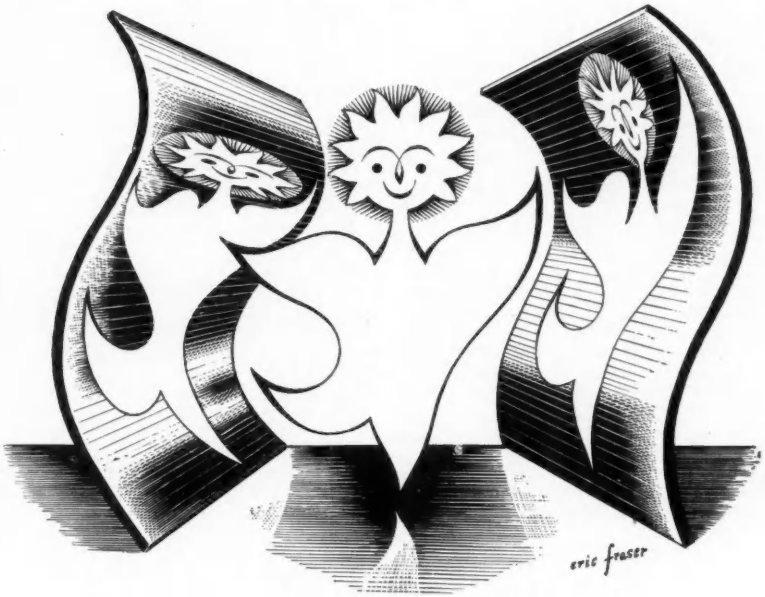

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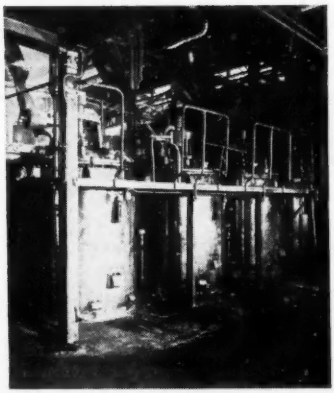

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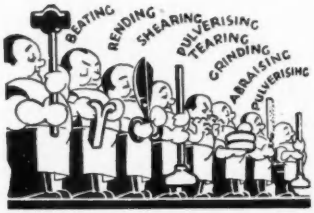

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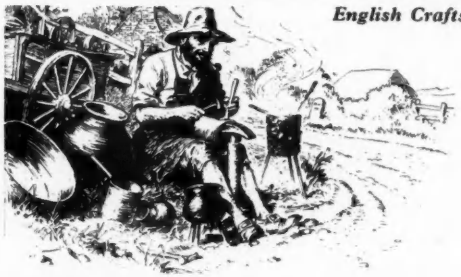

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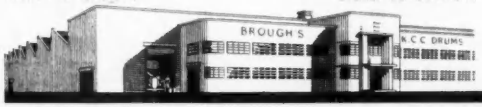

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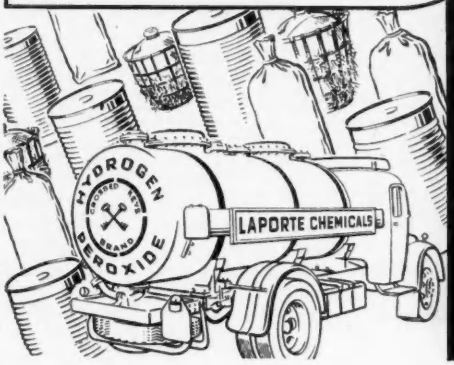

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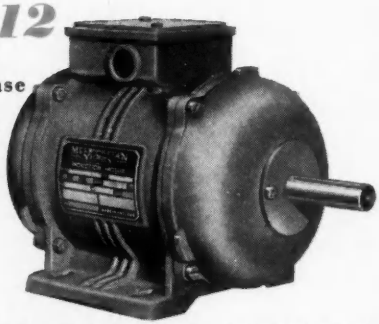

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